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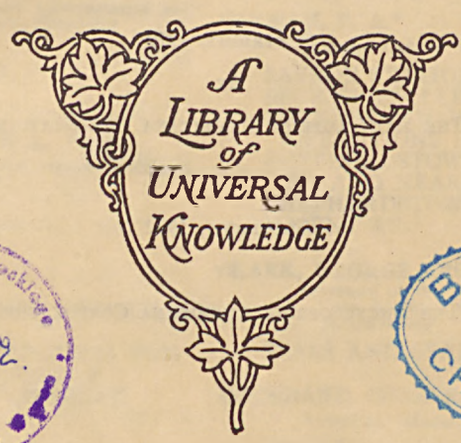
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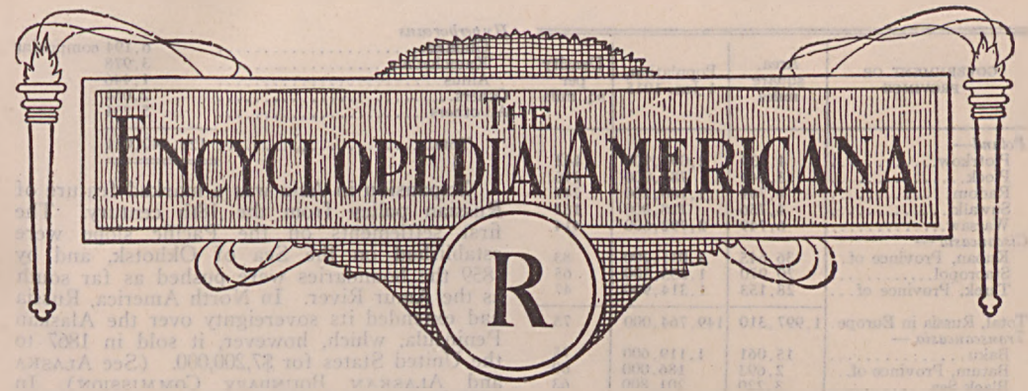
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KEY TO PRONUNCIATION.

ă	far, father	ñ	Span. *ñ*, as in *cañon* (căn'yŏn), *piñon* (pēn'yŏn)
ā	fate, hate	ng	mingle, singing
a or ă	at, fat	nk	bank, ink
ā	air, care	ō	no, open
ạ	ado, sofa	o or ŏ	not, on
å	all, fall	ô	corn, nor
ch	choose, church	ȯ	atom, symbol
ē	eel, we	o͝	book, look
e or ĕ	bed, end	oi	oil, soil; also Ger. *eu*, as in *beutel*
ė	her, over: also Fr. *e*, as in *de; eu*, as in *neuf;* and *oeu*, as in *boeuf, coeur;* Ger. ö (or *oe*), as in *ökonomie.*	o͞o or oo	fool, rule
		ou or ow	allow, bowsprit
ę	befall, elope	s	satisfy, sauce
ĕ	agent, trident	sh	show, sure
ff	off, trough	th	thick, thin
g	gas, get	t͟h	father, thither
gw	anguish, guava	ū	mute, use
h	hat, hot	u or ŭ	but, us
h or н	Ger. *ch*, as in *nicht, wacht*	u͝	pull, put
hw	what	ü	between u and e, as in Fr. *sur*, Ger. *Müller*
ī	file, ice	v	of, very
i or ĭ	him, it	y	(consonantal) yes, young
î	between e and i, mostly in Oriental final syllables, as, Ferid-ud-din	z	pleasant, rose
j	gem, genius	zh	azure, pleasure
kw	quaint, quite	' (prime), " (secondary)	accents, to indicate syllabic stress
ṅ	Fr. nasal *m* or *n*, as in *embonpoint, Jean, temps*		



RUSSIA (ROSSIYA), the general name of those portions of Europe and Asia which until 1917 formed the dominion of the "Tsar of All the Russias," and which are now broken up into several separate state formations. While the name Russia is applied to the whole area of the former empire it is frequently employed in a limited sense to Russia in Europe. The widest use of the term became current after the great expansion of the empire in the 19th century. The following articles, dealing with the area, topography, etc., consider Russia as it was at the beginning of 1917, before the fall of the empire. The history, government and political parties, language, education, etc., are considered as follows:

1. Geography, Topography, Political Divisions.
2. History.
3. Language.
4. Literature.
5. Drama.
6. Art.
7. Architecture.
8. Music.
9. Education.
10. Religion.
11. Government and Political Parties.
12. Industry and Manufactures.
13. Banking and Finance.
14. Railways and Communication.
15. Army and Navy.
16. Russia and the World War.
17. Russia, Diplomatic Relations of the United States with.

1. GEOGRAPHY, TOPOGRAPHY, POLITICAL DIVISIONS, ETC. Russia is a federated republic comprising the whole of eastern Europe from about 23° East, and stretching continuously for about 170 degrees over the whole continent of Asia to Bering Strait, or nearly half of the circuit of the world. The boundaries are the Arctic Ocean on the north, Bering Strait and Bering Sea on the east, the Pacific Ocean, Chinese Republic, Afghanistan, Persia, Asiatic Turkey and the Black Sea on the south, and on the west Esthonia, Latvia, Poland, Lithuania and Finland. The length east to west is estimated at about 6,500 miles; the average breadth north to south is about 1,500 miles. The whole area is officially given at 8,417,118 square miles, approximately twice the area of Europe, and one-seventh of the land surface of the globe. The republic consists of several well-defined parts; European Russia, the latter although less than a fourth of the whole, including nearly three-fourths of the entire population; in Asia — northern Caucasia, Transcaucasia, the Steppes, Turkestan, the Caspian and Transcaspian, and Sibera. The appended table gives the official divisions of Russia as it was on 12 March 1917, the date of the *coup d'état* which resulted in the fall of the Empire and the birth of the republic, their area, population and the density per square mile of land; the areas occupied by water are included in the total, but the densities of the population are calculated on the land area.

GOVERNMENT OR PROVINCE	Area, square miles	Population, 1 Jan. 1915	Density per sq. mile
European Russia—			
Arkhangelsk	326,063	505,700	1.6
Astrakhan	91,042	1,427,500	16
Bessarabia	17,143	2,686,600	157
Chernigor	20,232	3,148,900	156
Courland	10,435	812,300	78
Don, Province of	63,532	4,013,400	63
Esthonia	7,605	512,500	65
Grodno	14,896	2,094,300	141
Kaluga	11,942	1,497,200	125
Kazan	24,587	2,900,400	118
Kharkor	21,041	3,452,000	164
Kherson	27,337	3,806,900	139
Kholm	5,213	1,087,800	209
Kiev	19,676	4,988,000	254
Kostroma	32,432	1,855,900	57
Kovno	15,518	1,871,400	120
Kursk	17,937	3,276,200	183
Livonia	17,574	1,778,500	101
Minsk	35,220	3,070,900	87
Moghiler	18,514	2,551,400	138
Moscow	12,847	3,662,900	285
Nizhnii-Novgorod	19,789	2,081,200	105
Novgorod	45,770	1,729,300	38
Olonets	49,355	476,200	10
Orel	18,042	2,816,200	156
Orenburg	73,254	2,272,000	31
Penza	14,997	1,940,500	130
Perm	127,502	4,083,200	32
Petrograd	17,226	3,197,800	186
Podolia	16,224	4,127,600	254
Poltava	19,265	3,906,200	203
Pskov	16,678	1,447,100	87
Ryazan	16,190	2,795,000	173
Samara	58,320	3,899,800	67
Saratov	32,624	3,432,100	105
Simbirsk	19,110	2,124,500	111
Smolensk	21,624	2,210,200	102
Tambov	25,710	3,555,000	138
Taurida	23,312	2,133,300	91
Tula	11,954	2,016,000	169
Tver	24,975	2,402,900	96
Ufa	47,109	3,189,100	67
Vilna	16,181	2,083,200	129
Vitebsk	16,983	1,984,800	117
Vladimir	18,821	2,225,900	118
Volhynia	27,699	4,241,800	153
Vologda	155,265	1,772,200	11
Voronezh	25,443	3,687,000	145
Vyatka	59,329	4,062,000	69
Yaroslavl	17,723	1,416,700	103
Yekaterinoslav	24,477	3,537,300	144
Poland —			
Kalisc	4,377	1,342,400	307
Kielce	3,897	1,029,800	264
Lomza	4,588	819,700	179
Lublin	6,297	1,481,000	235

GOVERNMENT OR PROVINCE	Area, square miles	Population, 1 Jan. 1915	Density per sq. mile
Poland—			
Piotrkow	4,730	2,097,900	442
Plock	3,641	786,000	216
Radom	4,769	1,180,200	247
Suwalki	4,756	718,000	151
Warsaw	6,749	2,792,600	414
Ciscaucasia —			
Kuban, Province of	36,645	3,051,200	83
Staoropol	20,970	1,353,500	65
Terek, Province of	28,153	1,314,900	47
Total, Russia in Europe	1,997,310	149,764,000	75
Transcaucasia —			
Baku	15,061	1,119,600	75
Batum, Province of	2,693	186,000	69
Black Sea	3,220	201,800	63
Daghestan, Province of	11,471	732,600	64
Yelizavetpol	16,991	1,117,200	66
Erivan	10,725	1,034,800	96
Kars	7,239	403,000	56
Kutais	8,145	1,070,300	130
Sukhum, District of	2,545	147,600	58
Tiflis	15,776	1,394,800	88
Zakataly, District of	1,539	101,800	66
Siberia —			
Amur, Province of	154,795	261,500	1.6
Irkutsk	280,429	821,800	2.5
Kamchatka, Province of	502,424	41,400	0.1
Primorskaya, Province of	266,486	631,600	3.0
Sakhalin, Province of	14,668	34,000	0.5
Tobolsk	535,739	2,085,700	3.9
Tomsk	327,173	4,053,700	12
Transbaikalia, Province of	238,308	971,700	4
Yakutsk, Province of	1,530,253	332,600	0.2
Yeniseisk	981,607	1,143,900	1.1
Steppes — (Provinces)			
Akmolinsk	225,074	1,546,500	6.8
Semipalatinsk	178,320	874,900	5
Turgai	169,832	706,200	4.1
Uralsk	137,679	889,600	6.4
Turkestan —			
Ferghana	55,483	2,169,600	39
Samarcand	26,627	1,207,400	45
Syr-Daria	194,147	2,026,100	11
Semiryechensk	144,550	1,281,300	9
Trans-Caspian Province	235,120	552,500	2.2
Total, Russia in Asia	6,294,119	29,141,500	4.4
Finland	125,689	3,277,100	21.6
Internal waters	347,468	.....	.....
Total without Finland	8,291,429	178,905,600	4.6
Grand total*	8,764,586	182,182,600	20.8

* Finland, Poland, Ukrainia and other provinces have become separate states since the fall of the empire.

The ethnical composition of the population is as follows:

Aryans	100,331,516	comprising
Slavs	92,089,733	
Lithuanians	3,094,469	
Latins	1,143,000	
Germans	1,813,717	
Iranians	784,746	
Armenians	1,173,096	
Other Aryans	232,755	
Jews	5,070,205	
Uralo-Altayans	17,669,067	comprising
Finns	3,502,147	
Samoyeds	15,877	
Turks-Tatars	13,601,251	
Tunguz	69,664	
Mongols	480,128	
Georgians	1,352,535	
Other Caucasians	1,091,782	
Chinese, Japanese and Koreans	86,113	
Hyperboreans	33,602	comprising
Yukaghirs	948	
Koriaks	6,058	
Chukchis	11,795	
Eskimo	1,099	
Hyperboreans		
Ghilaks	6,194	comprising
Kamchadals	3,978	
Ainus	1,446	
Others	2,084	
All others	5,201	
Total	125,640,021	

Expansion in Asia was a marked feature of Russian policy from the 18th century. The first settlements on the Pacific slope were established on the Sea of Okhotsk, and by 1859 the boundaries were pushed as far south as the Amur River. In North America, Russia had extended its sovereignty over the Alaskan Peninsula, which, however, it sold in 1867 to the United States for $7,200,000. (See ALASKA and ALASKAN BOUNDARY COMMISSION). In 1872 it compelled Khiva (q.v.) to acknowledge the suzerainty of the Tsar, and in the following year Bokhara (q.v.), on which pressure had been brought to bear since 1850, and which had been invaded in 1866, became practically a Russian dependency. In 1875, the island of Sakhalin in the Sea of Okhotsk, north of Japan, was ceded to Russia by the Japanese. In 1898, after Japan's successful war with China, Russia obtained from Japan a lease of the Liao-tung peninsula, with the important ports of Dalny and Port Arthur (qq.v.), and after the Boxer uprising of 1901, occupied Manchuria (q.v.). Meanwhile Armenia had been partly absorbed; Russian influence had been strongly established in the Mongolian steppes, and the military outposts in Turkestan had been extended southward in the Pamirs

The continuity of the empire might appear to demand a detailed description in a single article; but its immense magnitude, and the distinct names commonly used to designate the different portions, make it more convenient to consider them separately under the heads of European Russia, and Siberia and Asiatic Russia. See article SIBERIA AND ASIATIC RUSSIA.

EUROPEAN RUSSIA.

Various classifications, partly historical and partly geographical, of the numerous divisions of European Russia, include Great Russia, Little Russia, South Russia, West Russia, the Baltic Provinces and Caucasus (qq.v.).

The boundaries of European Russia on the north and west are the same as those given above for the republic. Its southern boundaries also are the same as far east as the eastern shores of the Caspian Sea. The eastern boundary is not so well defined. In its northern part the Ural Mountains form such a definite natural barrier that their title to fix the frontiers of Europe and Asia, so far at least as the governments Archangel and Vologda extend, has been almost universally recognized. To the south of this the boundary may be said to be almost arbitrary, but is generally conceded to follow the Ural chain southward until it reaches the sources of the river Ural, and then follows the course of this river to its mouth in the Caspian. Parts of the governments of Perm and Orenburg, however, extend across the Ural Mountains, and are therefore in Asia. European Russia, as thus defined, is bounded northeast by the Ural Mountains, east by the government of Tobolsk, the steppes of the Kirghiz, and the Caspian Sea.

RAND McNALLY
POPULAR MAP OF
RUSSIA,
FINLAND, ESTONIA, LATVIA, LITHUANIA, GEORGIA, AZERBAIJAN

SCALES.

Statute Miles, 220 = 1 Inch.

0 25 50 100 150 200 250 300 350

Kilometres, 354 = 1 Inch.

0 50 100 200 300 400 500

Rand McNally & Co.'s New 11 x 14 Map of Russia.
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Longitude East from Greenwich

ARCTIC OCEAN
ATLANTIC OCEAN
BALTIC SEA
BLACK SEA
SEA OF AZOV
CASPIAN SEA
WHITE SEA
KARA SEA
GULF OF BOTHNIA
GULF OF FINLAND
GULF OF RIGA
SEA OF OKHOTSK
ARAL SEA
LAKE BAIKAL
LAKE ARAL
LAKE ONEGA
LAKE LADOGA
LAKE PEIPUS
LAKE VYGOZERO
LAKE KUBENSKOYE
LAKE BYELO-OZERO
LAKE WOSHE
LAKE SEGOZERO
LAKE KUTNO
LAKE KENT
LAKE IMANDRA
LAKE KOLA
LAKE EHAVA
LAKE NUOT-JÄRVI
LAKE KANDALAKSHA
LAKE VYGOZERO
LAKE KUBENSKOYE
LAKE BYELO-OZERO
LAKE WOSHE
LAKE SEGOZERO
LAKE KUTNO
LAKE KENT
LAKE IMANDRA
LAKE KOLA
LAKE EHAVA
LAKE NUOT-JÄRVI
LAKE KANDALAKSHA
LAKE ONEGA
LAKE LADOGA
LAKE PEIPUS

Topography.— The surface, in the most general view that can be taken of it, is two immense plains, the boundary between which is marked, though not very definitely, by a broad central ridge which stretches across it in an irregular waving line, mainly in a north-east direction, beginning on the frontiers of Poland, and terminating on the west side of the Ural Mountains, near lat. 62° N. This ridge forms the eastern continuation of the great watershed which divides the whole continent of Europe into a north and a south basin; but, unlike the west part, which is composed of lofty mountain chains or elevated plateaus, is only of moderate height, never exceeding 1,000 feet above sea-level. Even this height is attained only in the Valdai Hills, the far greater part of which, and of the remainder of the ridge, has an average height of not more than 500 feet. The only regions where the surface assumes a mountainous appearance are in the east, where the Ural chain, though nowhere, much exceeding 5,000 feet, looks more elevated, at least in its northern part, from its high latitude and consequent covering of perpetual snow; and in the south, where the Mountains of the Yaila chain, lining the southern shores of the Crimea, have a height of about 4,000 feet. With these exceptions the only other parts of European Russia which, according to the limits above assigned to it, do not belong to its two immense plains, are those districts of Perm and Orenburg which are situated on the east side of the Urals, and slope toward the almost boundless steppes of Asia. The coast-line of European Russia was confined to the Arctic Ocean until the end of the 17th century, and it was only by conquest that Russia obtained a seaboard on the Baltic and the Black Sea. The Arctic Ocean, affording excellent fishing grounds in the western portion, makes, with the White Sea, a deep indentation on the north coast, but its gulfs, Kandalaksha, Onega and Dvina, are ice-bound for nine months every year. Archangel, the chief port, is comparatively unimportant. Farther east, Cheskaya and Pechora bays are surrounded by frozen deserts. The Kara Sea, between the crescent-shaped island of Nova Zembla and the coast of Siberia, is navigable for a few weeks only every year. The islands of Kolgueff, Vaigatch, Nova Zembla, and the islands of Siberia are uninhabited. The Baltic Sea, with the Gulfs of Bothnia, Finland, and Riga, is the chief sea of Russia; but it nowhere touches purely Russian territory, its coasts being peopled by Finns, Letts, Esthonians and Germans. Nevertheless, three out of the five chief ports of Russia — Reval, Libau and Riga — are situated on the Baltic Sea. Two of them are frozen during four to five months every year; and Libau is the only one which has its roadsteads open nearly all the year round.

The Black Sea acquires more and more importance every year. The fertile steppes of its littoral are being rapidly settled, and the centre of gravity of Russia's population is gradually shifting south. The Black Sea suffers, however, from a lack of good ports. Its great gulf, the Sea of Azov (ports Taganvrog and Rostoff), is very shallow; the fine ports of the Crimea are too remote from the mainland; and the seaboard of Northern Caucasus is separated from the interior by a high chain of mountains. Odessa is the chief port of this sea; and it has no rival in Russia except Petrograd. Nikolaiev is the principal naval arsenal; and Sebastopol remains a naval station. Batum, the chief port of Transcaucasia, is of great importance for the export of petroleum. The Caspian Sea, which receives the chief river of European Russia — the Volga — is a valuable medium of communication between the central Asian dominions and the Caucasus, as also for trade with Persia; but it has no outlet to the ocean, nor is there any probability of connecting it advantageously by canal with the Black Sea, its level being 70 feet below sea-level.

Hydrography.— The rivers are remarkable for their number and magnitude. The broad central ridge already referred to forms the great water-shed of the country, sending the waters on its north side either to the Arctic Ocean or Baltic Sea, and those on the south side to the Black Sea or the Caspian, thus forming four distinct basins. The Arctic Ocean receives directly the Pechora, which drains chiefly the western slopes of the Ural Mountains by a number of important affluents, accumulates them into one great flood, which then flows almost due north, and empties itself into a wide estuary remarkable for the number of islands which the alluvial deposits of the river have formed within it. Through the White Sea, the Arctic Ocean receives the waters of the Mezen, Northern Dvina and Onega. The most important of the three is the Dvina, which receiving its supplies in nearly equal quantities from the east by the Vitchegda, and from the west by the Suchona, proceeds northwest in a circuitous course, continually augmented by large affluents, and falls into the Gulf of Archangel, a little below the well-known port of that name. The surface drained by the rivers of this basin is almost entirely confined to the two extensive governments of Archangel and Vologda. The basin next in order is that of the Baltic. Its principal rivers are the Kemi and Tornea (the latter common to both Russia and Sweden), which fall into the Gulf of Bothnia; the Kymmene, Neva, and Narva or Narowa, which fall into the Gulf of Finland; the Aa and Düna or Western Dvina, which fall into the Gulf of Riga; the Niemen or Memel, which enters East Prussia before terminating its course; and the West Bug, an affluent of the Vistula. To the basin of the Black Sea belong the Dniester, South Bug and Dnieper, which have all their mouths at a short distance from each other in the neighborhood of the rising seaport of Odessa; the Don, which falls into the northeast extremity of the Sea of Azov; and the Kuban, which derives its chief supplies from Circassia. The last basin, that of the Caspian, is in some respects the most remarkable of all, since, though Europe sends it only two large rivers, the Ural and the Volga, both supplied in part from Asiatic sources, the latter not only surpasses all other Russian rivers, but is one of the greatest of Europe. The lakes of Russia are on a scale of magnificence commensurate with that of the rivers. To say nothing of the Caspian, which, being wholly surrounded by land, and even incapable from the lowness of its level, of discharging itself into any other sea, is truly a lake — Russia has others of vast extent. To the basin of the Baltic belong Ladoga, the largest lake in

Europe; Onega, Peipus and Ilmen. Almost all the other lakes of any size belong to the basin of the Volga; chief of these are the Bielo-Ozero, in the government of Novgorod, and the Koubinsköe, in the government of Vologda. In the south are several large salt lakes, among them the Elton and the Khaki Salt Marsh, in the Government of Astrakhan.

Geology.—A vast tract of gneiss and other crystalline schists, penetrated by granite, extends east from the Gulf of Bothnia, and north from the Gulf of Finland over the whole principality of the latter name, the western part of the government of Olonets, and the extensive part of the government of Archangel which is isolated from its main body by the White Sea. The only other region where a similar development occurs is in the south, where a large granitic steppe stretches in a southeast direction. It begins near Ovrutch, in the northeast of the government of Volhynia, covers the far greater part of the government of Kiev, as much of the government of Podolsk as lies north of the Bug, the northern half of the government of Kherson, the west and south of Ekaterinoslav, and a part of Taurida, and terminates in Ukraine just before reaching the shores of the Sea of Azov, from which it is excluded by a narrow belt of Tertiary marls and limestone. In the east, however, and along the whole crest of the Ural Mountains, from their commencement on the shores of the Arctic Ocean, and almost continuously southward to their last ramifications, granite of more recent origin than that already mentioned occurs, in connection with other eruptive rocks of greenstone, porphyry, syenite, serpentine, etc. These rocks are overlain on both sides of the chain by metamorphic schists, forming long and narrow belts nearly parallel with its principal axis. Immediately to the west appears a similar belt of Silurian strata, which, where lowest in the series, is in the state of chloritic and talcose schists. The only other locality where the Silurian system receives a marked development is on the southern shores of the Gulf of Finland, where it stretches from its western extremity east along the governments of Esthonia and Petrograd, and is then continued across the isthmus between the eastern extremity of the gulf and Lake Ladoga, and along the southern and southeastern shores of that lake. In immediate contact with this Silurian formation on the south, but on a much more magnificent scale of development, appears the Devonian system, or Old Red Sandstone. The main body of this formation begins near the southeastern shores of the Baltic, and gradually widens out with its northeastern and southeastern sides, so as to assume the shape of a wedge. It then forms a wide fork, sending one of its branches northeast across Lake Onega, and along Archangel Bay to the northwestern extremity of Mezen Bay, and the other southeast to the northwestern frontiers of Voronezh. It thus covers continuously the whole of the governments of Kurland, Livonia, Vitebsk and Pskof, and parts of Vilna, Minsk, Mohilef and Smolensk, on the one side, and of Petrograd and Novgorod on the other; while its northeast branch traverses Olonets, and penetrates into Archangel; and its southeast branch stretches over considerable parts of Kaluga, Orel and Tula. The only other localities in which the same formation occurs is as a belt stretching south-southeast from the eastern coast of the Gulf of Tcheskaia in the Arctic Ocean, and in a longer but narrower belt on the western side of the Ural chain, where it immediately overlies the Silurian formation already mentioned. The formation next in order is the Carboniferous. The main body of it lies within the above fork of the Old Red Sandstone, and in immediate contact with it, and then keeping parallel with the northeast branch of the fork, is continued in the same direction to its termination in Mezen Bay. It occupies the whole of the government of Tver, the capital of which is situated near its centre; and large parts of Smolensk, Kaluga, Tula and Riazan on the one side, and of Novgorod and Olonets on the other. The government of Moscow is situated in the very heart of it, and that of Vladimir on its eastern side. It is evidently continued beneath these governments and covers part of their surface, the other and far greater part being covered by oolite or Jura limestone. The Carboniferous system occurs in two other distant and isolated localities; the one in the south, a little north of the Sea of Azov, where it occupies the eastern part of the government of Ekaterinoslav, and the western extremity of that of Don Cossacks, and where, too, the coal forming the characteristic mineral of the system is partially worked by pits; the other locality is on the western side of the Ural chain, where, in the ascending series, it succeeds the Silurian and Devonian systems, and has a larger development than either of them. This development of the Carboniferous system on the side of the Ural chain, and the still larger development above described as existing in the governments of Smolensk, Kaluga, etc., forms the opposite boundaries of a system which in European Russia is highly developed; and to which from the large space which it covers in Perm and the contiguous governments, the name of the Permian system has been given. Its rocks belong to the upper part of the coal measures and consist chiefly of magnesian limestone and new red sandstone. The latter name is still often applied to the whole system. The Permian system extends over the governments of Kostroma, Viatka and Kazan, and large parts of Archangel, Vologda, Yaroslav, Nijni-Novgorod, Simbirsk, Orenburg and Perm. In the north of the governments of Kostroma and Viatka, and more especially in the part of Vologda between the towns of Nikolsk and Ust-Sisolsk, it disappears for a time beneath strata belonging to the Jurassic or oolitic system. This system is developed partially in several other localities, and very largely in the northeast of the government of Archangel. Immediately above it in the geological series is the Cretaceous system, of which the principal localities are Chernigov, Orel, Kursk, Kharkov, and Voronezh, near the centre; Volhynia and a small part of Poland in the west; and a long tract along the northern base of the Caucasus. The rocks next in succession belong to the Tertiary formation, which in both its Eocene and Miocene periods is very largely developed. Strata of the Eocene period, beginning in the east in the government of Simbirsk, stretch west over the greater part of the governments of Penza and Tambov, then, after a considerable interruption, reappear on the frontiers of Kursk and Kharkov, cover the far greater part

of the governments of Chernigov and Poltava, and are thence continued without interruption into the governments of Mohilev, Minsk and Grodno. The Miocene period has its chief developments in Volhynia, Podolsk and Bessarabia. Beds of still more recent formation may be traced in the limestones, marls and clays on the northwestern shores of the Black Sea, on the far greater part of the Peninsula of the Crimea, on the eastern and northern shores of the Sea of Azov, on the low flats along the western and northern shores of the Caspian, and the low, sandy steppes of Astrakhan. Mere alluvial deposits, of comparatively recent date, are to be found in a greater or less degree at the mouths of all the rivers, and are particularly discernible in the great estuary of the Pechora. Vast numbers of erratic blocks and similar drift are spread over the greater part of northern Russia, evidently transported from Finland, Lapland and Sweden.

Climate.—As the country extends over 35 degrees of latitude, from the warmer regions of the temperate far into the regions of the frozen zone, it exhibits several marked diversities of climate, usually considered in four divisions—a polar region, including all the country north of lat. 67°; a cold region, extending from lat. 67° to 57° N.; a temperate region, from lat. 57° to 50° N.; and a warm region, from lat. 50° to 37° N. The characteristic features of the climate in general are a greater coldness and variableness than is common under the same latitudes in the more westerly parts of Europe. The mean annual temperature of the upper part of the Norwegian Coast to its extremity at the North Cape is above the freezing point, whereas a considerable portion of Russia within the same, and even in a lower latitude, is below it. This is true of the whole of Russian Lapland as far south as 66°; and to the east of the White Sea the thermal line, indicating a mean annual temperature of freezing, descends so rapidly that on reaching the Ural Mountains it is found to be as low as 60°. The region to which the name of cold has been given has a mean annual temperature varying between 32° and 40°, but very unequally divided throughout the year, the cold in winter often sinking the thermometer to 30° below zero, or 62° below freezing, while the summer heat often raises it above 80°. At Petrograd considerably below the centre of this region, the mean annual temperature is rather above 40°; on the other hand, that of Kazan, situated at the very south extremity of the region, but much farther inland, is rather below 36°. The temperate region, situated between lat. 57° and 50° N., has a mean annual temperature varying from 40° to 50°, and includes within it the far finest part of the Russian territory, though even there the thermometer has a very wide range, the summer heat, which suffices to grow melons and similar fruits in the open field, being often succeeded by very rigorous winters. The warm region, extending from 50° southward, well merits the name from its extreme summer heats, the thermometer in June and July standing commonly about 100°, and often considerably higher. It is not, however, free from the remarkable contrasts which a Russian summer and a Russian winter exhibit; for the Sea of Azov, situated almost in the heart of this region, usually freezes about the beginning of November and is seldom open again before the beginning of April. In all the countries bordering on the shores of the Baltic Sea and the Arctic Ocean, and bounded on the west and north by the basin of the Volga, the air is charged with a superabundance of moisture, which descends in mists and frequent falls of rain or snow. Toward the centre, and still farther east, the superabundance of moisture disappears, though enough still remains to keep vegetation in full vigor even at the hottest season. Still farther south the want of rain is often felt and long-continued droughts do frequent mischief. In general, however, the climates of all the regions are not unfavorable to health.

Forestry and Flora.—Forests are found chiefly in the more northern districts, particularly Archangel, Vologda and Perm, and cover about 39 per cent of the total area of European Russia. In many of the central and southern governments a deficiency of timber is seriously felt and many extraordinary expedients are resorted to in order to obtain adequate supplies of fuel. The districts most imperfectly provided with wood are Esthonia, Bessarabia, Kherson, Ekaterinoslav and Astrakhan. The prevailing trees of the northern forests are fir, larch, alder and birch. The oak is seldom found beyond lat. 61°. A considerable proportion of the surface still continues almost in a state of nature; and, where it is well wooded, it is a question whether any other mode of occupation would be equally productive. Russia possesses about 3,400 species of phanerogamous plants, but the examination which botanists have made is incomplete and it is probable that many remain to be discovered.

The forest area of European Russia covers a territory of 474,000,000 acres. In the Ural Mountain region forests cover 70 per cent of the total area. In 1917 the revenues derived from the state forests amounted to 111,206,000 roubles (about $55,603,000); the expenses amounted to 41,592,000 roubles ($20,796,000), leaving a net profit of 69,614,000 roubles ($34,807,000).

Fauna.—Animals, both domestic and wild, are numerous in Russia. Among the latter are the bear, the wolf, wild hog, the desman, the mole-rat, the saiga, the bobak or Russian marmot, the elk, the bison, the lynx and various animals which are hunted for their furs. Wild fowl abound, particularly near the mouths of rivers; among them the pelican frequents the shores of the Black Sea. Both on the coasts and in the rivers a great number of productive fisheries are carried on. In the Arctic Ocean whales are killed and vast numbers of seals are taken. The rivers of the Caspian, particularly the Ural and Volga, and the Sea of Azov, are celebrated for their sturgeon. In the same quarters are also important salmon fisheries. Reptiles are few and mostly innocuous.

Land Tenure.—Under the empire the political divisions of the Russian people comprised numerous grades of nobility, which were partly hereditary and partly acquired by military and civil service, especially the former, military rank being most highly prized. The clergy, both regular and secular, formed a separate privileged order. The higher clergy were formerly possessed of great wealth, but much of their property was confiscated by Catherine II, who compensated them by state pensions. Pre-

vious to the year 1861 the mass of the people were serfs subject to the proprietors of the soil. The emperors Alexander I and Nicholas I took the same initial steps toward the emancipation of this class; but a bold and complete scheme of emancipation was begun and carried out by Alexander II. The decree of emancipation was dated 3 March 1861 and began to come into execution within two years. There were about 22,000,000 of serfs belonging to private proprietors and rather more than that number on the crown lands. By an imperial decree of 8 July 1863, lands were granted to the peasants on all the estates of the Crown on a 49 years' rental equal to the former poll-tax and as a freehold estate at the expiration of this period. A similar arrangement was made on behalf of the peasants on the lands of private proprietors. The redemption money of the serfs with their land was estimated at 16⅔ years' purchase of their annual produce. Twenty per cent of this had to be paid by the serfs on procuring their emancipation, the remaining 80 per cent was guaranteed by the government, which levied it from the peasantry in a tax extending over 49 years. The emancipation of all the serfs on these terms was arranged for by July 1865, and from that date this form of servitude ceased to exist in Russia. From this change until 1917 the cultivable land in Russia was mainly distributed among three classes. The Crown held nearly 35 per cent, the emancipated peasants about 20, while the remainder, with the exception of mines and town lands, remained in the hands of the nobility and other landed proprietors. Soon after their advent to power in November 1917 the Bolsheviki undertook the solution of the land question. All private ownership was declared to be henceforth null; the land was nationalized and given to the people who cultivated it. The large estates of the nobility, all the lands belonging to the state and to the Church were left to the disposition of local committees pending a decision of the Constituent Assembly. Mines, forests and great waterways became the property of the state; while lesser forests and waterways were turned over to local communes.

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2. RUSSIAN HISTORY. The Russian Slavs were one of the Asiatic tribes designated by the Greeks, "Scythians," who in unknown times immigrated into the vast plains of eastern Europe. They had settled near lakes and rivers in the primitive forests of the region extending east and west from lakes Ilmer and Chud to the lower banks of the Dnieper and the Dniester. There were other East-Slavonic tribes: the Lithuanians, west, and the Finns north of them, while the Turks and Tartars lived in the southeast. The Russian Slavs lived

in small communistic and patriarchic groups governed by the Vieche (a council of family elders) until the Variagi, or Northmen, helped them to form an independent state. No exact data is available concerning its origin. It is unknown whether the Slavs submitted to the Northmen of their own accord or whether they were forced into submission by conquest. According to the chronicle, the state originated in 862 when the three Varangian brothers, Rurik, Sineus and Truvor, became rulers of the Slavonic Stenm clan, the country began to be called Russia, and Novgorod became the centre of the principality. Simultaneously another centre, Kiev, sprang up in the south where two Varangian brothers, Askold and Dir, had formed another principality. Upon the death of Rurik's brothers, their territory also passed to him and he assumed the title Grand Prince. The successor of Rurik was his relative Oleg (879) whose wisdom and steady success gave him the surname "Vieschi," which means "soothsayer." He extended his rule over all the Slavonic clans except the Viatichi and imposed upon them a heavy tax. He took possession of Kiev and made it the capital of his principality, naming it "Mother of Russian Cities." He also led an expedition against Byzantium with the results which favored Russian business enterprises in Greece. Oleg was followed by his son Igor in 912, who also several times attacked Byzantium but with no success. His main object was to quell uprisings of subjugated Slavonic clans and to repel attacks of the pillaging savages of the Ural Steppes, called Petchenegi. He met his death in 945 at the hands of Drevlian, a Slavonic clan, while visiting them for the purpose of collecting the yearly tribute. Upon Igor's death, his wife, Olga, an energetic and cunning woman, became ruler for the time of their son's minority. She avenged her husband's death by setting on fire the capital of the Drevlian, Kastrov, and then subjugating its people. The most noteworthy event of her time is her conversion to Christianity (957).

When her son Sviatoslav became ruler, he displayed all his cunning and ambition in the numerous expeditions for the purpose of conquest. He defeated the Turkish tribe Khazarui and subjugated the Viatichi, the only Slavonic tribe still under tribute to them. At the suggestion of the emperor of Byzantium Nikifor Fok, he turned his weapons against the Bulgars along the Danube, but with no consequences. Returning home he was killed near Kiev by the Petchenegs who in his absence had attacked the city (972). Sviatoslav had divided his dominion among his sons, but it was reunited by the youngest son Vladimir; he killed his oldest brother Yaropolk who had already assassinated another brother Oleg and subdued several revolting clans. He also made several successful attacks on the Poles, the Yatvags and the Bulgars along the Kama. The most significant event of Vladimir's rule was the conversion of the Russians to Christianity (988) after Vladimir's conquest of the Greek city Khersan. Until then they had been pagans and worshiped all natural phenomena which they represented by different idols. Vladimir, at first cruel, voluptuous and an assassin, is known to history as the "Beautiful Son of Kiev," due to a change said to have been worked in him by the Christian faith. Following the custom of the time Vladimir before his death in 1015 again divided the country among his sons, Garoslav, Yaropolk and Sviatopolk, but Garoslav reunited it at the time of the mutual fight of the brothers in which Yaropolk died and Sviatapolk fled. Garoslav I like his father divided in 1054 the Russian principality among his sons, the oldest receiving the principality of Kiev with the title of Grand Prince. This division of the country into a group of states was known as the system of Appanages. Each state had a ruling prince and subordinate or appanaged princes. The grand prince had authority over all of them and lived in the capital. He had a guard, called the *druzhina*, consisting of volunteer warriors who were his friends and counselors at all times and were well rewarded for their services. The drushiniks (members of the druzhina) of the highest rank called *Boyare*, acted by the appointment of the king as viceroys in cities, as judges, called *tiunui*, and collectors of tributes and fines. The king himself was chief justice. The main administrative was the *Viechi*, a popular assembly convened by the princes. Its head was the *possadnik* elected by the people, who next to the prince was the highest authority. The possadnik, just as well as the tiuiniu guarded social order and conducted trials. Self-government had reached its highest development in Novgorod which had become almost an independent state. Novgorod was also the commercial centre in the North, just as Vladimir in the South, both having business connections with the Hanseac Union formed of the German cities on the coast of the Baltic and the German Sea. While the system of the Appanages on the one hand favored the distribution of population and the development of commerce, on the other hand it led to internal wars of the appanaged princes. After Yaroslav the right of succession to the throne was transferred from the oldest son to the oldest in the family and Yaroslav's sons and grandsons ruled one after another. Their rule was greatly disturbed by internal wars of the appanged princes, complicated by the question of seniority in such a large family as that of Yaroslav. During these struggles Kiev was subject to attacks and pillage which finally caused its fall. In the second half of the 12th century it was replaced by another capital, Vladimir upon the Kliazma. At that time Russia began to suffer from the destructive invasions of the Palovtzui, a tribe kindred to the Pechenegs. For better protection against the external enemy, the cousins and nephews decided to make peace and by the treaty in Linbetz (1097) resolved that everybody inherit his own paternal estate. In spite of it the internal wars continued until Vladimir Monomakh, the son of Vsevolod and grandson of Yaroslav I, became ruler. He was the first to realize the ideal of a peaceful principality with the grand prince as the supreme power. He exercised his authority to stop the wars of the appanaged princes and, instead, have them join him in his expeditions against the savages to check their invasions.

The internal wars, however, had considerably weakened the country, and it could not resist the wild hordes of the savage Mongols and Tartars. Their invasion resulted in Russia's subjugation to Mongol oppression (1237) and the formation of a Tartar kingdom, the Zolo-

taya Orda, along the lower Volga, with Sarai as its capital. In these days two prominent figures stand out. Aleksander Yaroslavitch Nevsky, prince of Novgorod, and Daniel Romanovitch Galitzki in the South. The first attained fame through his victory over Birger in the war against Sweden, and the second, by checking the invasions of the Lithuanians, who at that time had united with Poland and became a powerful principality to balance the power of the German orders on the Baltic Coast

The first attempt at freeing Russia from Mongolian oppression was made by Dimitri Danskoi (1363–89). He defeated the Tartars in the famous battle of Kulikov 8 Sept. 1380 and after renewed attacks under Ivan III they were driven from Russia and the Zolotaya Orda was destroyed. The Lithuanian conquest pressing in from the west, and the Tartar invasion from the south, greatly impeded the growth of the Moscovite empire into which the northwestern territories had begun to form, with Moscow, founded according to the chronicle by Yuri Dolgoruki (in 1147) on the Moscow River, as the dominating city and later, under Joann Kalita the capital and ecclesiastical centre. The first steps toward building the Moscovite empire was the annexation of the principality of Novgorod by Vasili I (1389–1425) and the abolition of self-government by the dissolution of the Vieche (1478) under Joann III (1462–1505), the son of Vasili II (1425–62) and the grandson of Vasili I. The two remaining territories, Pskov and Riasan, were annexed by the son and successor of Ivan III (1505–08).

The first prince to be crowned (1547) Tsar of Moscow was Ivan IV, son of Vasili III and Helen, the daughter of a Lithuanian magnate. This was a time of great oppression and revolt. The former friendly relations of grand princes and druzhina had long ceased. The peasants were in serfdom, having been tied by the Moscovite princes to the land which they cultivated. The members of the Boyarskaya Duma, the ruling power during Ivan's minority, contested for individual power at the expense of the people's freedom and the little Tsar's education. As a result he developed into a hardhearted and cruel man, hence his surname "Grozni" (Terrible). Oppressing the people, Ivan was suspicious of disloyalties and was liberal with punishments by death. His lack of success in the war against the Polish King Stefan Batore he ascribed to treason. His bodyguard were the "oprichniki" (a band of young noblemen) of whom he required a complete renunciation of their parents, and absolute submission to him. These sad days were brightened by the conquest of Siberia, an achievement of the Cossacks of the Don and their leader Ermak. The hard and exciting times of Ivan the Terrible were followed by the peaceful rule of his son Feodor (1584–98), a pious and mild prince who left the ruling to the Boyarskaya Duma, headed by Boris Gudunov, his wife's brother. As he was childless and his brother Dimitri dead, the line of Ruriks came to an end with his death. The people and the *Zemskaya Duma* (an assembly of merchants and landlords which convened only in important cases) elected the cunning Boris Gudunov to the throne despite the opposition of many boyars. With this Tsar begins the period of incessant troubles in Russia. Boris, suspicious of the hatred of the boyars, spared no punishments and, as a crowning piece of misfortune, the country was stricken by famine and epidemics. At his death he left the throne to his son but Lzhedimitri (False Dimitri), pretending to be Feodor's dead brother, by the help of the Polish King Sigismund, who dreamed of spreading Catholicism in Russia, seized the throne and ruled 11 months, when he was assassinated by a conspiration headed by Vasili Shniski, who succeeded to the throne. During his rule another pretender, Lzhedimitri II, unsuccessfully besieged Moscow for two years. Here begins the period of interregnum and anarchy. The Moscovite Crown was threatened by the Polish King Sigismund and was saved only by the bravery of a meat merchant Kozma and Prince Pozharski; the former by his fiery patriotic speeches stirred the people of Novgorod, who, joined by other cities, elected Pozharski as their leader and forced the Poles to surrender. The Zemskaya Duma convened in 1613 and elected to the throne Michael Fedorovich of the dynasty Romanov. When the dynasty of Romanov came to the throne the Moskovite Empire extended from the Arctic Ocean to the mouth of the Don and Caspian Sea, and from the White Sea to the Ural Mountains and throughout Siberia. Its main cities were the capital, Moscow, fortified by the famous Kraul, and the two commercial cities Novgorod and Arkhangelsk engaged since Ivan III in negotiations with Holland, Germany and England. The territories in the immediate vicinity of Moscow were called the territories of the Grand Prince. They were inhabited by a mixture of Finns and Slavs. In the south lived the Cossacks, in the Don region, while Turkish and Mongolian tribes inhabited the steppes of Azov and the Black Sea. Southwestern Russia was occupied by the Polish-Lithuanian Kingdom, of which the main divisions were Little Russia, White Russia and Galicia. Though the Russians in these regions were the Greek Orthodox, the union of Liublin (1569) made them recognize the Pope as the ecclesiastical head. This aroused the discontent of the people and finally led to the uprisings of the Cossacks which resulted in the separation of Little Russia from Poland and its annexation to Russia under Alexei Mikhailovitch. Later (1667), however, the western region went back to Poland. With Michail (1613–45), anarchy came to an end and peace and order were re-established. The rule of his son and successor, Alexei (1645–76) is marked by a revolt of the people against oppression and heavy taxation as in the time of Ivan III. This pointed to the necessity of a new code of laws and the Sobornoye Polozheniye was composed. Ivan's oldest son, Feodor Alexsieyevich (1676–82), succeeded him and six years later was followed by Peter the Great, the youngest son of Aleksei Michailovich and Natalia Naruishkina, as his older brother Joann, son of Maria Miloslavskaya, was in ill-health. Owing to the ambition of their sister Sophia Miloslavskaya two parties formed and contested for the throne. The result was that both princes were crowned in 1682 and Sophia made regent till Peter's majority.

Peter the Great spent his childhood in the suburban Moscovite village surrounded by foreign friends and instructors. He often visited the German settlement called the Koki and made the acquaintance of German officers who assisted him in building a little army while playing at soldiers with his boy companions. German officers had been called to Russia by Peter's father and grandfather to teach the Russian soldiers military arts. There were at that time in Moscow many other foreigners of different professions, such as merchants, physicians, druggists, architects, who had begun settling there during the rule of Joann III, when relations with Europe, broken during the Mongolian oppression, had been resumed through his marriage with Sophia, the daughter of the emperor of Byzantium, who came to Russia together with many Greeks and Italians. At the age of 17 Peter I placed in a monastery his sister Sophia, who still had pretensions to the throne, and by means of intrigues tried to attain her ends and finally succeeded in sharing the reign with her brother. Tsar Peter's interest in the army and navy, which was shown in his early childhood, still continued. He went twice to Arkhangelsk to view foreign vessels and conceived the idea of gaining a foothold on the Azov Sea for the purpose of trading with Southern Europe. After an unsuccessful attack he triumphantly took possession of Azov in the next year (1696). He then set out traveling in western Europe to study fortresses and to learn the arts of Western civilization. He joined his own embassy to Europe and, disguised as a Dutch carpenter, settled in Sardam to study the art of shipbuilding. There he boarded with a blacksmith, but, upon identification he changed his abode for Amsterdam, where he continued his studies. He was impressed by foreign customs and manners and began reforming Russia according to foreign models. He tried even to change the appearance of the Russians by replacing the feriaza, a long coat with very long sleeves, by the long-tailed coat and the kaftan, and by prohibiting a beard to all except the clergy and the peasants, unless a tax were paid for the privilege of wearing one. He turned also his attention to the condition of women, against whose seclusion he strongly protested, and made the Moscovite princes introduce their daughters in society, costumed according to Western fashions. He organized gatherings for social intercourse which he called "assemblies." Marriage agreements were to be made only by the consent of the two concerned and not by their parents, as had been the custom up to this time. With the change of the Russian ways and habits Peter also started a reconstruction of the empire. In the place of the former prikazni he established collegii, the different branches of which were to take charge of commerce, revenue, army and navy, etc. The Boyarskaya Duma was replaced by the Senate and different German official ranks were substituted for Russian. Ecclesiastical affairs were entrusted to the Synod, an assembly of archbishops, which was to take the place of the former patriarchate. He was aware of the lack of education and established schools for children of the nobility, who were not allowed to carry before they could read and write. The army as well as the people, particularly the clergy and the staroviertzi (i.e., old believers), were dissatisfied with the foreign innovations. Protesting against the strict foreign discipline the army revolted during Peter's absence abroad, but the revolt was quelled and the rioters severely punished upon his return. Dissatisfaction with the reforms was persecuted and tried by a special secret court (Tainoe Sudilishte) before which one could be brought by any one who cared to denounce his personal enemies by simply pronouncing the words «slovo i dielo» (i.e., "word and act"). Peter replaced the militia called "strieltzy" by a standing army to be composed of peasants and urban population. Military duties became compulsory even for the young noblemen unless declared unfit or employed in the civil service. The greater part of his reign Peter spent in wars against Sweden. In alliance with Poland and Denmark he set out against the Swedes for the recapture of lost possessions along the Gulf of Finland, but after the battle of Narva (1700) retreated with heavy losses. This encounter with the Swedes was for him a lesson in the art of warfare and he utilized it to gain a foothold on the Finnish coast (1703) by capturing many cities in the absence of King Charles who was fighting the Polish king, August II. By taking possession of the Swedish fortress Nienshanz upon the Neva, he came into possession of the river, and under his own supervision built there a church and the Peter-Paul fortress as the nucleus of Petrograd which he now made the capital. Charles XII was lured again to Russia by his hopes to secure the Little Russia, whose hetman (or chief) Mazeppa turned traitor to Peter and promised to assist the Swedes with a great army of Cossacks. Charles XII met, however, with a crushing defeat in the battle of Poltava, 27 June 1709, and together with Mazeppa fled to Turkey. Here he instigated the Turkish sultan to declare war against Russia. With an army of 40,000 Peter set out for Turkey to face a considerably greater army of Turks and Tartars on the shores of the river Pruth. He was repelled, however, and by the Treaty of Pruth was forced to give up Azov and with it the outlet to the Southern seas and the mouth of the Don (1711). He succeeded, however, in establishing himself firmly on the coast of the Baltic Sea where, as a result of a warfare of 10 years, by the Treaty of Nieshtat (1721) Sweden ceded to Russia Livland, Esthonia and Ingria (the present district of Petrograd). In that same year he crowned himself, assuming the new title of "Imperator." Peter's infirm brother having died, his empire went to his grandson, Peter II, whose father, Aleksei, had died in exile escaping his death sentence pronounced against him by Peter I for expressed dissatisfaction with reforms. Peter Alekseiyevich was, however, only 10 years old, and Peter's second wife, Katharine I, used the opportunity to become ruler for two years (1725–27). At the expiration of this period she appointed Peter Alekseiyevich as her successor, and the Supreme Secret Council, a body of high officials, as the regents during his minority. As Katharine I was German by birth the chief officials of the empire under her were Germans, and Ostermann, the son of a German pastor, was at the head of the government. The same state of affairs continued when Peter

Alekseiyevich died before he reached his majority, and the Duchess of Courland, Anna Joannovna (1730–40), the daughter of Joann V, ascended the throne. Biron, a native of Courland, was at the head of the government. He was a cunning and hard-hearted man who for his selfish purposes imposed a heavy tax on the peasants and exacted it with unusual cruelties. At that time Munnich, who was in charge of the military affairs, introduced strict discipline in the army. He was the founder of the corps of cadets for the training of military officers. He became Prime Minister under Anna Leopoldovna, a niece of Anna Joannovna and the mother of little Joann VI (1740–41), whom Anna Joannovna appointed her successor to the throne. The dissatisfaction of the people with a foreign court grew greater and greater, and as a result little Joann, with his mother, Anna Leopoldovna, spent the rest of his days in the Schluesselburg fortress where Biron was also imprisoned. The domination of Germans at the Russian court came to an end with Elizabeth (1741–61), second daughter of Peter I. Munnich and Ostermann were exiled to Siberia and the Germans were replaced by Russian statesmen, Razumovski and Shuvalov. In those days it became the custom to use the French language at the Russian court. The nobility and the bureaucracy, following the tone of the court, engaged foreign educators for their children. Elizabeth's rule was marked by valuable internal improvements. During her reign the first Russian university (1755) and the first Russian theatre were founded in Moscow, the Academy of Science having been established in Petrograd by Peter I. External affairs also proved to the world that Russia since Peter the Great was occupying a prominent position among European powers. It participated with great success in the Seven Years' War as an ally of Maria Theresa, empress of Austria, against the Prussian king, Frederick II.

The rule of Elizabeth's successor, Peter III, the son of her sister Anna, was of a very short duration. However, he succeeded in half a year in earning the gratitude of the people by abolishing the secret courts with its much-hated «Slovo i Dielo.» He was succeeded by his worthy wife, Katharine II, née Princess Anhalt-Ferbst, whose rule of 34 years (1762–96) was for Russia a period of expansion. Russia came into possession of the long-desired outlet to the Black Sea, and hence to the Mediterranean by her victories over the Turks at Larga and Kagula (1770) under the command of Rumiantzev Zadunaiski in the so-called First Turkish War which ended by the Treaty of Peace concluded at Kuchuk-Kainardgi (1774); and in the Second Turkish War, under the commanders Potyenkin and Suvarov, in which she took possession of the famous fortresses Ochakov (1788) and Izmaihil (1790) and, by the Treaty of Peace of 1791 concluded in Yassmui, obtained the territory on the northern coast of the Black Sea. By the third partition of Poland, Russia annexed White Russia, Voluinia, Lithuania and Courland. This took place in 1795 when, after a desperate battle under the leadership of Kosciusko and the successive partitions, the Polish kingdom ceased to exist. During Katharine's rule Eastern Russia suffered a great deal from the insurrection stirred by the Cossack, Pugachev, who pretended to be the dead Peter III, and, with a band of Cossacks, Tartars and fugitives of malcontent peasants and laborers of the Ural-works, attacked and took possession of one fortress after another along the Ural boundary, putting to death their commanders. The insurrection was finally subdued and its leader executed in Moscow in 1775. Catherine II carried out and promoted some of the important reforms started by Peter I. He had divided Russia into 12 districts; she extended the division to 150 governments (districts) with subdivisions into counties in 1775. Each district had its administrative and judicial departments. Two hundred villages were turned into townships with a local administration. The city charters of 1785 divided the urban population into three classes: the merchants, the citizens and the craftsmen. The centre of the city administration was the city council (*Gorodskaya Duma*) and its head was the mayor elected by the people. The nobility was granted a charter defining its rights and privileges. These were a voluntary military body exempt from taxation and corporal punishment. Peter the Great had placed church property under state supervision. Catherine II made the land and the serfs belonging to the Church property of the Crown in 1764. She attempted also a reform of the Russian judicial courts by abolishing tortures at trials and contemplated a code of new laws. She had composed her own legal maxims and appointed a committee to help her draw up a new code of laws, but these attempts were stopped by the outbreak of the Turkish wars. She showed great concern in the spread of education by establishing several city schools and a few other educational institutions; as also in the moral rectitude of the people by increasing salaries of officials in order to stop bribery. She also took an active part in educational reform by writing fairy tales and comedies in which she ridiculed vice for the purpose of correction. Her reforms were continued by her son and successor, Paul I (1796–1801). Of these the most valuable was the improvement of the condition of the peasant serfs limiting the service to their masters to three days in the week. He further reconstructed the army following the Prussian style which was then considered the model by all Europe. He introduced even the Prussian decorative court uniform of locks and pigtails. When the French Revolution broke out, Paul I formed an alliance with England, Austria and Prussia to fight the French revolutionists, but dissatisfied with his allies he soon withdrew his troops after some successful military operations in Italy. His successor, Alexander I (1800–25), is represented in history as a good-natured man of a friendly attitude who won the favorable disposition of the people by the changes which he at once instituted. Some of his edicts greatly improved the condition of the peasantry and gradually led to its emancipation. His main administrative reforms were: the removal of the system of collegii established by Peter I and their replacement by a group of ministers, such as the Ministry of the Interior, the Ministry of Education, Ministry of War and others. He

also established the Imperial Council which acted as a Senate or Upper House. His activities on the educational field are also significant, for he promoted the general learning of the masses, established many higher schools, as *Gymnasia, Progymnasia,* theological seminaries and universities. Under the protectorate of Alexander I, Karamskin compiled the first 'History of the Russian Empire,' and the Metropolitan of Moscow, Platon Sershin, wrote in 1812 a 'History of the Russian Church.' Alexander I appreciated to a high degree the works of Pushkin and Krylov, the two great poets of his time. His further plans for internal improvements and reform were impeded by the great wars which swept over Europe with the appearance of Napoleon I. Russia participated in the anti-Napoleonic campaigns, first as an ally of Austria and was defeated at Austerlitz, and then as an ally of Prussia, both being defeated at Friedland. Peace concluded in Tilsit (1807) was soon disturbed again by the reappearance of Napoleon in 1812. He invaded Russia with a great army and despite the desperate fight of the Russians under the commander Barklai-de-Tolli, they were defeated in the famous battle of Borodino. Napoleon then proceeded to Moscow which he entered only to find it in flames and ruin. Famine and the severe cold of the Russian winter forced the French to withdraw with enormous losses. Napoleon hurried to France intending to return with a reinforced army, but Alexander I, by an offensive attack transferred the scene of military operations first to Germany and then to France herself. Allied with other European powers, he finally succeeded in defeating Napoleon and, by the Treaty of Vienna (1815), which gave Europe a general peace, Russia annexed the Polish territory along the Vistula. There were yet further territorial expansions of Russia under Alexander I through his wars against Sweden, Turkey and Persia. Upon the conclusion of peace with Sweden, Russia obtained all Finland, and the war against the Turks ended with the annexation of Bessarabia (1812), through the splendid victories of Kamenski and Kutuzov. About the same time Russia came into possession of the kingdom of Georgia. By a treaty of 1813 its king, George XII, agreed to have it become a dependence of Russia whose protection he sought against Turkish invasions. Alexander I was childless and his brother Konstantin Pavlovich, at that time Viceroy of Poland and residing in Varsow, was proclaimed emperor of Russia. He abdicated, however, in favor of his younger brother Nicholas. The dissatisfied people used this occasion for a rebellion. The leaders who were members of noble families and army officers persuaded the troops under their command that Nicholas was the author of a plot against his brother. The mutiny was quelled on 14 Dec. 1825, and a great number of revolutionists called «Decembrists» were executed or exiled. This incident of 1825 made Nicholas see the inadequacy of Russian laws for his times and he commissioned Strauski to draw up a new code of laws which appeared in 1833, known as «Svod Zakonov.» The most important events of his rule were the abolition of the «Uniya» and the Polish insurrection which ended unsuccessfully. Nicholas I led two wars against Turkey, the first for the liberation of the oppressed Greece, which came to a victorious end in 1829 and sealed by the Treaty of Adrianople, and in the second, called the Crimean War, Russia suffered heavy defeats at the hands of Turkey and her allies, England and France. After a vain resistance of 11 months, the strong fortress Sevastople, was destroyed in 1855. The Crimean War ended during the reign of Nicholas' successor Alexander II (1855–81). By the Treaty of 1856 Russia lost her control over the Black Sea. Alexander II continued his father's foreign policy of expansion. The southern boundary was pressed further down by the annexation of Eastern Caucasia (1859) after a continuous war of 60 years. Five years later the western part was also annexed. The Siberian frontier was moved southward at the expense of Central Asia where Russia made conquests in the wars against Bokhara and Kokand (1868). In 1877 Russia declared war against Turkey in support of the oppressed provinces of Serbia, Herzegovina and Montenegro. In the spring of that year the Russian army crossed the frontier, captured Nikropolis, and after successful battles of Shipka Pass and Plevna, stormed Kars to free its way to Constantinople. The Ottoman Empire was forced into submission and Alexander dictated the peace terms at San Stefano (1878) exacting for Russia a large war indemnity. The advantages gained by Russia were, however, lost again, due to England's and Germany's intervention. By the peace treaty in Berlin, Turkey's stability and independence were restored, Montenegro and Serbia were recognized as independent, and Bosnia and Herzegovina were given temporarily to Austrian administration. Russia, however, regained Bessarabia which she had lost in the Crimean War. It seemed for a time that Alexander II was stirring Russia toward greater liberty. On 19 Feb. 1861 he signed the famous manifesto emancipating the serfs and the charter, granted them in 1862 on the anniversary of Novgorod's milennium, made them almost self-governing. He recalled from Siberia the exiles of the conspiracy of 1825 and the Polish exiles of 1821. All this made the people hold out hopes for greater freedom. Bitter disappointment followed, for Alexander continued an autocratic strict policy with the oppression of non-Russian nationalities. Renewed Polish attempt for a separation was mercilessly crushed. Their oppression grew worse; the Polish language was banished from their schools, Polish landowners were made to sell their land and Poles were prohibited from buying. The Ukrainophile movement which had originated in Little Russia in Nicholas' time also grew stronger under Alexander's renewed oppression of the Ukrainians. Alexander's improvements in railways, telegraphs and postal service promoted financial development. This, however, affected but little the general prosperity of the people. The embitterment culminated in the assassination of Alexander II. The effect of this assassination was the austere policy of his son Alexander III who was crowned at Moscow in 1883. Every act of his expressed his opposition to reforms. It was a gloomy period of great restriction and oppression of non-Russian nationalities, the peasantry became more

impoverished. His foreign policy was that of expansion and he continued the conquest of Central Asia until the Siberian frontiers closely approached Afghanistan. The policy of Russian tsars was not in the least changed under the last Romanov Nicholas II (1894–1917). His autocratic attempts for territorial expansion involved the country in the Russo-Japanese War which led to the surrender of Port Arthur and crushing defeats at Mugden. The despotic régime grew more intense. Pobiedonostev, called the "evil spirit of Russia," practically ruling Russia from 1881, now became omnipotent. The Zemstvos, rural provincial organizations created by Alexander II for the self-government of peasants after their liberation, were increasingly repressed in their activities. Poles, Jews, Armenians, Georgians and various sects of Orthodox malcontents were oppressed and persecuted. The anathematizing of Leo Tolstoy by the Holy Synod characterizes the country's attitude toward the freedom of speech and conscience. Despite the fact that Nicholas appealed in 1898 to the Great European powers to form a peace conference at The Hague for the discussion of terms for a lasting international peace, he had no sympathy with progressive reforms. These were achieved by the Revolution.

The Uprising of the Decembrists was the culmination of a long growing dissatisfaction which was still more stirred by the democratic ideas which the Russian officers brought back from their anti-Napoleonic invasion of France. Upon their return to Russia they formed secret societies for dissemination of these ideas. The organizers of these societies hoped to reach a democracy in Russia by influencing Alexander I, who in the beginning of his rule was very progressive and instituted many reforms. At first Alexander I seemed to bend toward the progressive element. He planned to grant a constitution and a large measure of self-government, but ultimately yielded to his reactionary advisers. He not only was on watch against the revolutionary movements at home, but also helped to suppress such in Germany, Spain and Italy, having obliged himself to do so by signing the protocol. The execution and exile which followed the suppression of the mutiny in 1825 still more embittered the people. The secret societies for the purpose of overthrowing the autocracy began to grow. Their branches scattered all over Russia. With the growth of popular discontent and unrest, the rule of Nicholas I, called the "Iron Tsar," became more austere and more oppressive. He tried to crush all progressive movements by establishing a strict censorship and a secret service police which became the terror of the fighters for liberty. The leaders of the societies called "circles," men like Petrashevski, Hezen and Bakunin, became more active. The discontent was followed by outbreaks on the part of the peasants. The defeats suffered by Russia in the Crimean War lessened in a high degree the confidence of the people in the government and the cry for reforms grew louder. When Alexander II ascended the throne he could not but obey the national will and he introduced a series of reforms, chief amongst which were the emancipation of the serfs, 1861. This, however, appeased the peasants only for a short time. For though released the peasants continued to live in bondage. The soil allotted to them was to be paid for and the period for payment was 50 years. Autocratic ruthlessness continued. Its natural consequence was increased activity on the part of the revolutionaries. New secret societies came into existence. "Land and Freedom," organized in 1876, instigated agrarian uprisings. Their suppression was followed by terroristic acts. High officials were assassinated and finally Alexander II himself paid with his life, 13 March 1881.

The immediate successors of Alexander II, Alexander III and Nicholas II, were still more reactionary. Instead of carrying out reforms promulgated by Alexander II, they met demands for reforms with a greater restriction of the press, wholesale arrests and exiles to Siberia. These measures could hardly moderate the discontent. The oppression of the people took more definite form. The revolutionary element organized into parties which were mostly of a socialistic nature. The best known of these are the Social-Democratic and the Social-Revolutionary parties and the "Bund." The methods of fighting the government were also changed. Terroristic measures were replaced by a systematic development of revolutionary literature and its rapid spread. The failure in the Russo-Japanese War, in the same way as the defeat in the Crimean War of the time of Nicholas I, discredited the government in the eyes of the people. Along with their legal movement for freedom grew out another which endeavored to bring about reforms by legitimate means. On 21 Jan. 1905, the people decided peacefully to approach the Winter Palace and to ask for freedom. The response of the government was firing upon the crowds in which there were many women and innocent children. This incident, called the "Bloody Sunday," enraged the people and a series of revolutionary outbreaks followed. This marked the beginning of the Revolution of 1905. Aware of the general popular unrest the government saw no other expedient but to grant a constitution in October 1905. The liberties which it promised, however, were withdrawn before they were ever realized. The general strike which followed the withdrawal was successfully broken and the revolters were savagely punished. Massacres of Jews crowned the triumph of the government. Of all granted reforms only one remained in force. This was the establishment of a Duma, i.e., a parliament, however, only of a consultative nature. The first Duma with a majority of Constitutional Democrats convened in April 1906, but was dissolved for its demands of a limited monarchy. The second Duma met with the same fate. The third Duma which was composed mainly of reactionaries was in session five years without accomplishing anything of importance. Exile to Siberia remained still a prominent and effective measure of the government. Only the fourth Duma elected in 1912 succeeded in bringing about a change of great significance. The unrest in the world of labor and strikes had ended by an apparent triumph of the government. When the War of 1914 broke out the Duma was still a pillar of reactionism. The Duma and the people were two hostile camps, but the war brought them together. Almost

all political factors found it advisable to join the Russian government in its struggle against German autocracy which oppressed Russia economically. Moreover, all Russians united in the common work of war relief for which purpose the *Zemstvos* became one of the main factors of the Revolution and formed an "All Russian Zemstvo Union" with a general committee and Prince Lvov as its president. The towns and different industries also formed into unions, while the people, both revolutionaries and conservatives, were drawn nearer to each other by common interests. At the same time, they began to lose their confidence in the government on account of its repeated defeats in the field. This lack of confidence was especially manifest when Russia's defeat and heavy losses inflicted by Hindenburg in the autumn of 1914 was followed by the execution of a member of the Russian General Staff, Colonel Myasoyedov, for treason; and, when after the occupation of Poland, Lithuania and parts of Loluinia and Courland by the Germans, the Minister of War, Sukhomlinov, was found guilty of accepting bribes. The persecution of Jews and their removal from homes near places of military operations (1914–15), in order to veil the treacherous acts of the government, did not produce the desired effect on the people; on the contrary, it only increased bitterness.

The reactionary element of the people also became hostile to the government and when the Duma met in 1915, the Octobrists (the Conservative wing, so named after the manifesto of October 1905), joined their former political opponents and formed the so-called "Progressive Bloc" in August 1915. The main point of the program was the demand of a coalition government composed of men who would enjoy the confidence of the people, a true parliamentary form of government and various progressive reforms. This was the first move of the Duma for liberty and reform. Upon this, the reactionary Goremnikin, who was then at the head of the government, obtained the tsar's signature for the suppression of the Duma. The members of the Cabinet who favored concessions to the Duma were recalled and reactionaries appointed in their places. Furthermore, the government disgraced itself in the eyes of the people by its submission to the so-called "dark forces," i.e., a clique behind the government prompting and helping it to serve its private ends. The centre of those "dark forces" was a monk, by the name of Rasputin, who, playing upon the ignorance, superstition and prejudices of the Imperial Court, gained an easy access to it in 1905 and used its influence to obtain appointments and promotions to high official positions of the various charlatans who had won his friendships, as also the ruin of those toward whom he was not favorably disposed. His influence was so great that he once succeeded in forcing the very Synod to nullify its own decision. Among the associates of Rasputin there were such personages as the metropolitan of Petrograd, Pitrim, and Manasevich-Mamilov, who acted for the Russian government as secret agents. This influence of the "dark forces" on the government brought about the split in the conservative circles and a strange opposition of the few who endeavored to conclude a secret treaty of peace with Germany. The people became especially suspicious when Boris Sturmer, the grandson of an Austrian Teuton, succeeded Goremnikin as Prime Minister with the portfolio of the Minister for Foreign Affairs, which he took from Sasonov, when the latter retired in demonstrative opposition to a separate peace with the Central Powers. In order to prevent any further anti-peace discussions the press of the country was severely censored. The heaviest blow, however, which caused great irritation, was the order of the cabinet in the spring of 1916, prohibiting all national conventions or conferences of the social organizations for relief work. But the protestation and unrest of the people were of no effective consequence as long as the armies were with the government. The revolutionary element, however, commenced gaining ground with the military circles. This was to a certain extent accomplished by the fact that most of the social workers at the front were revolutionary college students who spared no efforts to enlighten the soldiers by establishing schools in which they conveyed to them the idea of democracy. When the Duma met on 14 Nov. 1916, its speakers, one after another, attacked the government, and its president, Rodzianko, a rich landowner, who enjoyed the fullest respect of the conservatives of the country, came out openly against the Prime Minister, Sturmer. In the speech delivered by the leader of the Constitutional Democrats, Sturmer was also severely attacked. Even the reactionary Pirreshkevitz assaulted the Minister of the Interior who was guided by the policy of Sturmer and worked for a separate peace. For the first time in Russia's history, the greater majority of the Imperial Council sided with the Duma and severely criticized the government and the "dark forces" behind it. The congress of the nobility, which met in December, joined the rest unanimously denouncing the "dark forces." The War and Marine Ministers at once declared themselves on the side of the Duma and Prime Minister Sturmer saw no other way out of the difficulty but dissolving the Duma, and set out for the general headquarters to urge the emperor to approve of his step; but before he reached his destination he was informed of his dismissal by the imperial order. A. Trepov succeeded him. Before adjourning for Christmas the Duma adopted a resolution protesting against the forces undermining the nation's effort to win the war and endorsing the activities of the social organizations. The embitterment in high circles against the evil influences of the "dark forces" resulted in the assassination of Rasputin, 30 Dec. 1916. The murder was followed by the removal of several ministers whose seats were filled by strongest reactionaries. On 1 Jan. 1917, the tsar gave a blow to the liberal forces of the Imperial Council by issuing an edict recalling a large number of progressive members and replacing them with reactionaries. The bureaucrat Scheglovitov was made president of the council. The cabinet was also to be reorganized, replacing its members with strongest reactionaries before the next meeting of the Duma. On 27 February the Duma convened. On that day 30,000 laborers went on strike in Petrograd. The trouble in the Duma began with the refusal

of Scheglovitov to permit the leaders of the left group (revolutionaries) to make a declaration. In response to that measure the revolutionaries, together with a number of members of the centre, left the hall. The invitations sent by the leaders of the Progressive Bloc to the members of the cabinet for the discussion of measures for reform were ignored. Meanwhile hunger stirred the discontent of the people and soldiers, especially in view of the fact that food-supplies were found stored away by the police. In March riots began in Petrograd. The government responded by calling out troops to patrol the streets and proclaiming martial law. The demonstrations of all classes of people were becoming numerous when almost all the newspapers stopped their work and the organized laborers of Petrograd elected a council for the direction of general strikes and the great revolutionary movement that was pending. The Progessive Bloc, then still in session, framed a resolution to break with the government. The tsar issued an edict ordering its dissolution on 11 March. The Duma ignored the order. The government tried to restore its authority by ordering the police to use their weapons freely against the people. Disguised as soldiers of the Voluinski regiment they fired, killing and wounding about 200 of the crowd. In the afternoon the Voluinski regiment joined the revolutionaries. Other regiments, one after another, followed their example. The president of the Duma, Michail Rodzianko, sent to the tsar warnings at repeated intervals. The tsar, however, ignored the warnings of the Duma as well as those of his generals. Aided by the army the revolutionists made gigantic steps. The main arsenal fell into their hands; police stations were demolished. The famous prisons, the Peter and Paul fortress and Schluesselburg, were attacked in a rapid succession. Joined by released prisoners, some of whom were leaders of the Petrograd uprising of 1905, the rebels proceeded to the secret service department and set on fire its archives. In the afternoon of the same day, 12 March, Taurida Palace, the meeting place of the Duma, was surrounded by the revolutionary forces. The telephone and telegraphic apparatus were captured. Kerensky, leader of the Social-Democrats, and Miliukov, leader of the Constitutional-Democrats, addressed the regiments and their speeches were cheered by the revolutionists. Thus the people and the Duma joined hands to finish the work of the Revolution, while some of the reactionary officials either resigned, as did Premier Galitznin, or disappeared altogether. The members of the Duma appointed a council of 12 members representing all parties. This council, called the Duma Committee of Safety, represented the Duma and the Labor party and, after a night's session, issued a proclamation calling the people to order and effecting a complete overthrow of the old régime. On 13 March, various military organizations, headed by their officers, appeared before the Duma committee to express their submission, and on that same day the regiments defending the Admiralty surrendered. On 14 March the emperor's body guard joined the revolutionists and the Winter Palace was occupied by the rebels. By a mutual consent of the two representative bodies (Duma Committee of Safety and the Council of Workers and Military Deputies) a provisional government was formed which decided to ask the emperor to abdicate and proclaim Grand Duke Michael regent. The Committee of Safety in Petrograd then informed all other cities that the old government had been deposed and a new and temporary government formed by the Duma. The provisional government was at once recognized by all the cities of the empire. Moscow and Charkov were the first to do so. Also foreign governments, through their diplomatic representatives, recognized the new order of things and announced their readiness to enter upon negotiations with the provisional government. Meanwhile the ex-Premier, Sturmer, General Kurlov, General Komissarev and many other high officials were arrested. The chief of the Black Hundreds (i.e., the originators of massacres), Dr. Dubrovin and the metropolitan Pitrim, member of the "dark forces," met with the same fate. The Duma committee appointed a special commission to take charge of the railroads, telegraphs and telephones and of various other governmental departments. Encounters between the revolutionists and the police still continued and hundreds of the police officials were arrested. The revolutionists had the unanimous support of the commanders-in-chief and of the Petrograd clergymen and officers, who issued appeals to the people and armies, respectively, to continue their revolutionary work. On 15 March the tsar abdicated in favor of his brother, Grand Duke Michael, who, in his turn, abdicated the next day, thus ending the rule of the Romanov dynasty. As the people objected to the deposed tsar's liberty, he was placed, together with his family, under arrest in the Tzarskoe Selo where the guards had also revolted. The imperial family had to part with a great number of their servants and were deprived of all telephone and telegraphic connections with Petrograd. The colossal income of the tsar's estates now went to the State Treasury. The first step of the provisional government was the attempt to restore order and Professor Yurevich was appointed chief of police. Investigations in the former activities of the bureaucrats were started energetically as a preliminary step in their trials. Many chiefs of the fallen régime were arrested. Among these there were Baron Frederick, General Vozeykov and General Zrozovski of Moscow. The provisional government marked the beginning of its administration by ordering full amnesty to all political prisoners and offenders, the complete emancipation of the Jews, the abrogation of the Pale of Settlement, the abolition of death penalty, the abolition of the police and the formation of a militia. Soldiers were granted freedom of speech and uncensored communication with their homes. Immediately after the Revolution labor councils were formed after the model of the Petrograd council. The *coup d' état* of the Maximalists (Bolsheviki) in November 1917 resulted in the setting up of a Communist state and great economic demoralization. In 1921 certain modifications were made in the system and trade relations were resumed with several nations including England. See WAR, EUROPEAN; RUSSIA AND THE WAR.

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3. RUSSIAN LANGUAGE. In historical times the Slavic languages appear already subdivided into three groups, the southern, the western and the eastern. The southern comprises the Serbo-Croatians and Slovenians, known as Jugo-Slavs, and the Bulgarians; the western consists of the Czechs, Slovaks, Serbo-Lusatians and Poles; the eastern embodies all the Russian dialects. It is doubtful whether the present subdivision of the Russian dialects into Little, White and Great Russian goes back beyond the 11th century, but since then these have formed distinct groups, and the present growth of nationalism in the Ukraine bids fair to bring about a strong literary development of Little Russian, while White Russian may politically and socially disappear in the newly-created Lithuanian, Polish and Little Russian nationalities. Kiev was originally Great Russian, but early in the Middle Ages Little Russians kept moving up from Galicia until now they can claim linguistically the territory north as far as the government of Syedlets and parts of Grodno and Minsk. They hold the governments of Poltava, Kharkov, Voronezh and extend into Chernigov, Kiev, Volhynia, that is, they are found in the territory provisionally denominated as the Ukraine. The White Russian, an intermediary between Great Russian and Polish, is found in the governments of Grodno, Vilno, Vitebsk, Pskov, Mogilev, Minsk. Although used in historical documents in the Middle Ages it never developed a literature of its own.

The Great Russian, which we shall now call Russian, is divided into two large groups, by a line running from Lake Peipus to Nizhni-Novgorod and thence directly east. The chief characteristic of the southern group is the pronunciation of unaccented *o* as *a*, which is not the case in the north. The chief representative of the southern group is the local Moscow speech, which is the basis for the official language, and, both on account of its political importance and the softness of its consonantal enunciation, bears the same relation to the Russian dialects that the Sienese or Florentine bears to the Italian dialects. But the Muscovite pronunciation is not rigorously followed outside the southern group. In the north the unaccented *o* remains *o*, and throughout the vast territory which belongs to Russia, without being Great Russian, the school pronunciation is normalized and more regular than in the soft utterance of Moscow, thus bearing the same relation to the Muscovite that the English of American schools bears to the Bostonian or New England pronunciation.

The language of literature and the Church up to the 18th century was not Russian, but Church Slavic, which is of southern Bulgarian origin, due to the dissemination of Christianity from Bulgaria. But from the very beginning the local Russian speech of Kiev intruded into the vocabulary and pronunciation of the Church and modified it, while the Bulgarian of the Church language similarly affected the spoken language. Thus the Church Slavic of Russia in time assumed a special aspect in the Church books of the Russian redaction, later to reenter Serbia and Bulgaria and reintroduce a considerable Russian element into the southern languages.

The Bulgarian introduced a very large number of phonetic and morphological peculiarities into the spoken language, especially in words connected with the intellectual and religious life. The chronicles and judicial documents employed from the start a language which was essentially Great Russian, but with an admixture of Church Slavic words. Though originally an Indo-European language, Russian has a considerable non-Indo-European vocabulary. The Finnish tribes of the north and the Tatar nations of the south, even before the Tatar invasion, have enriched the vocabulary, and there are still other unaccounted-for elements in the language, which of late have been ascribed to a prehistoric residence in the Caucasus. Beginning with the 14th century Moscow takes the place of Kiev as an intellectual centre, and here the local speech, which arose from a union of southern and northern dialects, penetrates into the written language, and the local literary varieties of Novgorod, Tver and Ryazan soon pale before the administrative language of Moscow. Since then the Russian has received new linguistic additions. The most refined literary Polish furnished a considerable number of words, dealing with manners, and the introduction of the technical arts from the West opened the door to Dutch and German words, which entered in alarming quantity with Peter the Great. Later, the adoption of Western culture has given an enormous number of words from the German, the Romance languages and the Latin for scientific purposes. If one considers that possibly one-third of the Church Slavic represented Greek borrowings, and that these were also bequeathed to the Russian, one can see that the Russian, like most literary languages, is very composite in its nature. From the 16th century on the spoken language is more and more used as a means of written expression, but up to the 18th century the Church Slavic maintained itself successfully in the Church. With the growth of culture, the spoken Muscovite and the Church Slavic blend into one, and in the second half of the 18th century the literary norm is established, to be perfected by Karamzin and Pushkin into a harmonious tongue, capable of all uses to which a literary language is put.

The Russian language is, in spite of the prevailing opinion, not a difficult language, although very rich in grammatical forms and forbidding to the beginner on account of its strange alphabet. The alphabet is identical with the Church Slavic, except that Peter the Great in 1708 simplified its letters by bringing them in harmony with the simpler Latin letters of the West. This current form of the alphabet is known as the civil alphabet, as opposed to the Church Slavic Kirilitsa. The alphabet consists of 37 letters, but two of them are rarely used, and the Bolshevik Minister of Education has ordered the abandonment of the useless hard sign and the superfluous *ye,* which is phonetically identical with *e* and of *y,* which is identical with *i.* This reform has long been mooted and, should it become universal, Russian would be the best phonetic language of Europe. The additional letters to the Latin alphabet are not a hindrance, but an advantage, because in Polish and Czech, where the Latin alphabet is used, the diacritical marks used to represent additional sounds are not conducive to easy and rapid writing. The accent is variable in Russian and extremely difficult if studied in itself. Therefore, all the better grammars and readers, even those for the Russian schools, where non-Russians may happen to be, are accented throughout. It can be acquired only by long practice, when analogy, which guides the native in his speech, automatically and with fair safety furnishes a clue to the accent of any new form one may meet. The pronunciation of Russian is not difficult, but the chief difficulty to the Westerner lies in his tendency to harden soft combinations. Before *e* and *i* and the vowels beginning with *y,* such as *ya, ye, yo,* all the consonants, but more especially the dentals, become distinctly palatalized, that is, these are pronounced not with the tip of the tongue pressing against the roof of the teeth, but by touching the palate with the tongue higher up. Another difficulty is the hard *l* before *a, o* and *u,* which is not pronounced, as in English, between the tip of the tongue and the root of the teeth, but, while the tip of the tongue rests against the teeth, by vibrating once the uvula and producing a guttural *l,* akin to a gutteral *r.* The other sounds offer no especial difficulty. The phonetic changes within the conjugation of the verb or in derivations, which appear so puzzling to one beginning the study of Russian, is in reality produced by an attempt to remain phonetic, for in English or French practically the same phenomenon may be observed, only while the Russian writes *noshu* for *nosiu,* the English writes *mission* and pronounces *mishon.* A clear understanding of the law of phonetic change removes this difficulty far more thoroughly than the difficulty of the English pronunciation can be overcome by a foreigner.

The Russian noun has three genders and two numbers, like the Latin, and seven cases. Each gender is declined differently, but their plurals practically are identical, except for the genitive case, which causes some difficulty. The neuter singular does not materially differ from the masculine, but the feminine has totally different forms. What complicates the declension is the fact that words with a soft or palatalized ending have to be declined soft throughout, and there are very many variations in the genitive and prepositional cases, due chiefly to a confusion of the historic *o* and *u* declensions. Such forms can be acquired only through long practice. The dual of the Church Slavic has almost entirely disappeared, leaving but feeble traces in words naturally dual, such as that for «eye, ear.» The most curious reminiscence of it is found after the numerals «two, three, four,» when the noun stands in the genitive singular, because that form frequently corresponded to the nominative dual. From «five» on the genitive plural is used by analogy. The adjectival declension is interesting from the fact that by the side of an apocopated form of it, which almost entirely coincides with that of the noun and which is used only in the predicate, there is a fuller declension, formed originally from the nominal endings plus the corresponding endings of the personal pronoun of the third person, which was used as an article. Thus we have the curious phenomenon of a post-positive article, which is still in full use in Bulgarian, in existence in all the unrelated languages of the East, in the Scandinavian of Germanic origin, in all the Slavic languages, in Rumanian of Latin origin and in Albanian. The Russian is not fond of an attributive genitive and generally turns such into a corresponding adjective, hence it is far richer in adjectival forms than the languages of the West. The vast majority of family names ending in *ov, in, ovich, ski,* etc., are just such adjectives, hence the absence of titular *von* or *de,* or anything that corresponds to it, from the Russian vocabulary. The adjectives practically lack the superlative, which is supplied by the comparative or various intensive adjectives or particles. The chief difficulty in the formation of the comparative is the doubling of forms caused by drawing the apocopated comparative chiefly from the native Russian, and the full attributive comparative chiefly from the corresponding Church Slavic formation. The numerals are bothersome because every one of them is declined, and in a combination such as «one thousand two hundred and forty five men» six different declensional forms will occur. While the nominal declension is complex, the syntactical application of it is rather simple, because the abundance of cases, each one with a distinct function, obviates the difficulty which is ever present in a language without grammatical endings, such as French, where only the closest of attention makes one expert in the use of *de* and *à.* Thus Russian, though full of perplexing difficulties, has the unusual compensation of a language with a minimum of syntactical rules.

In the verb the relation between syntax and grammatical forms is reversed. Of the whole intricate structure of the Church Slavic, with its aorist and multiplicity of past tenses, very little is left. Only one, unconjugated past is

left. The future is a compound of *I shall* and the infinitive, but in a large class of verbs the present does duty for the future. Thus there is only one tense, the present, that really can cause difficulty, on account of a number of consonant changes that are liable to happen. There are only two conjugations, and a simple rule accounts for the great majority of the so-called second conjugation, leaving everything else to the first. There is a wealth of simple participial forms, which are also found apocopated and are called gerunds. These make it possible to express a large number of adverbial phrases in a very simple and precise way. But, to atone for the absence of a complicated conjugational system, there is the matter of aspects which to the beginner is likely to prove a stumbling block, but which supplies the language with a mass of delicate shades of expression which the Western languages can seldom render correctly. A verb expresses either the action, when it is of the imperfective aspect, or the result of an action, when it is of the perfective aspect. Most verbs have the two, and many are capable of even more delicate distinctions. An imperfective aspect may refer to an indefinite action or to an action with a definite aim; a perfective aspect may not only refer to the result of the action, but also to its suddenness, when it becomes self-active. In addition, there are iterative verbs, which represent frequently repeated action. Many verbs have all or nearly all of these forms, which differ from each other by suffixes and prefixes, added in a definite way. The perfective has only two tenses, the past and the future; the iterative only one, the past, and the imperfectives, all three. Only long training makes one perfect in the use of these, but in reading the matter is not of such pressing importance.

The Russian avoids the passive voice and has an exceedingly simple way of expressing the subjunctive, which is made up from the unconjugated past tense by the addition of a particle, but makes up these deficiencies not only by the very comprehensive aspects, but also by the use of a reflexive which does not differ from the rest of the verbs, except for the addition of the unchanged reflexive ending. Besides, a particular shade of involuntary action, such as to express the idea *I want to eat*, as the result of hunger, and not as a wilful act, is expressed by an impersonal construction, so that the ambiguity of the English is always avoided.

The sentence structure of Russian is simplicity itself. Though originally the Russian, through the Church Slavic, based its sentence on the periodic Greek speech, Karamzin, who had studied in England, popularized the simple co-ordinate arrangement of clauses, as against the intricate and clumsy German subordinate periodic structure, and this simple style has remained the norm. The language is simple and direct. Add to this the facts that the order of words is quite immaterial, since it is guided exclusively by emphasis, that the indirect discourse is practically unknown and that a small basic number of words furnishes an inexhaustible number of derivatives of every imaginable shade of meaning, and it will become clear that the Russian language cannot possibly be so difficult as it is generally represented to be. The trouble is that all the troublesome points are met with at the very start, but, while the difficulties of German, for example, keep increasing, the difficulties of Russian stop very soon. Thus in a given period, after the rudiments have been mastered, considerably faster progress can be made in Russian than in German.

As the Russian vowels are all open, except in specially favored positions, and the consonants are not harsh, the Russian language is particularly adapted to singing, even beyond Italian For literary purposes it is especially good, since the most difficult ideas of any literary language can be rendered with remarkable fidelity; hence Russian literature abounds in fine translations, whether of Homer, Shakespeare, Goethe, Beranger or of any other foreign poet. The innate beauty of Russian has struck not only foreigners, but has long been known to the Russians, for already Lomonosov said of it, "One may find in it the magnificence of the Spanish, the vivacity of the French, the force of the German, the tenderness of the Italian, and, besides, the wealth and the expressive brevity of the Greek and the Latin," while Turgenev said of it that "it is unthinkable that such a language should not be given to a great nation."

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4. RUSSIAN LITERATURE. Nothing whatsoever is known of any literary activity in Russia previous to the introduction of Christianity in the 10th century, and even for a long period afterward it found its expression, not in Russian, but in the language of the Church, that of the proto-apostles Cyril and Methodius, which in all likelihood was the Bulgarian, as spoken in the neighborhood of Saloniki. This Old Church Slavic was so close to the Russian dialects that it could be understood with little exertion by the clergy and those rare intellectuals who found any need to give expression to their thoughts. Up to the 12th century there is only a slim collection of sermons and exhortations, but at the end of this period we have the noteworthy 'Instruction of Vladimir Monomakh to his Children,' which compares favorably with similar spiritual testaments of the period, such as that of Saint Stephen of Hungary. A little later we get the admirable account of the Holy Land by Abbot Daniel the Palmer, which even now elicits praise for its realistic account of the time of the first crusades. To the same period belongs Nestor's 'Chronicle of Kiev,' that set the pace for a considerable number of local chronicles, from which in modern times the history of ancient Russia has been reconstructed. There must have existed, at that time, a considerable secular literature, but the Church ruthlessly persecuted any such manifestation, and only folk epics, for the first time collected in the 19th century, give us any poetical reminiscences of Kiev in the days of its greatest glory. Only one literary production of exceptional beauty has escaped the persecution of the Church, 'The Word of Igor's Armament,' a prose poem dealing with a disastrous expedition of Prince Igor against the nomad Polovtses of the South. This, too, was first published in the beginning of the 19th century, when it immediately attracted universal attention and was translated into many foreign languages. There also has been preserved a 14th century imitation of this production in 'The Exploits Beyond the Don,' which is an interesting account of the battle at Kulikovo in 1380. The Middle Ages are in Russia unusually rich in a mass of apocryphal stories, bestiaries and romantic adventures, which serve as important links between the Greek and Latin apocryphal literature and similar productions in the West. As an example of these may serve 'The Holy Virgin's Descent into Hell,' which contains elements akin to those worked up by Dante in his 'Divine Comedy.' No appreciable addition to literary style is to be observed before the 16th century, when Polish scholastic learning at Kiev began to penetrate into Russia at the same time that Western ideas found their way to Moscow through the protection given to foreigners by Ivan the Terrible. It is then that we get the feeble beginnings of Russian history by the exiled Andrey Kurbski and the 'Book of Management,' the 'Domostroy,' by Ivan's adviser, Sylvester. This is apparently an attempt to create for Russia a manual of manners, such as at that time appeared in Italy and elsewhere. Its unusual harshness has made the 'Domostroy' a by-word for the Asiatic rudeness of the pre-Petrine civilization. Only at the end of the 17th century does a weak light enter from the West in the writings of Simeon Polotski, who came entirely under the influence of the Kiev scholasticism. He thus precedes the period of Peter the Great, with whom a new era dawns upon Russia.

Peter the Great abolished the old Church script, and introduced in its place the modern alphabet, which leaned to some extent on the Latin script. With this, Peter the Great broke with the ecclesiastic tradition, and by degrees the vernacular Russian, at first strongly impregnated with the Church Slavic, makes its entrance into the written language. The time of Peter was productive only of utilitarian works on mathematics and the applied sciences, but we have even then the remarkable economic work 'The Book on Poverty and Wealth,' by Ivan Pososhkov, the peasant manufacturer, who was called the Russian Adam Smith. 'The History of Russia' by Tatishchev did not see its light until the end of the century, as there was no interest as yet in such literary production in the time of Peter, but the 'Spiritual Reglement' of Prokopovich, who advocated Peter's liberal reforms, was one of the first Russian books to be translated into English. Kantemir's satires, based on those of Boileau and Horace, appeared in the time of Queen Anna, and about the same time talentless Tredyakovski established the prosody for the Russian poetry, and a little later the many-sided Lomonosov, in his poetical productions and scentific labors, laid the foundation for the literary norm, which half a century later was to be perfected in its present form by Karamzin. The second half of the 18th century is especially rich in the drama, where, however, nothing notable was produced, except in the comedy. Here we have the classical 'Odd People,' by Knyazhnin, 'The Minor,' by von Visin, and 'The Pettifogger,' by Kapnist. Among the writers of historical dramas are Sumarokov, the creator of the Russian theatre; Knyazhnin, whose republican sentiments in 'Vadim of Novgorod' created quite a stir, and Ozerov, whose 'Dmitri Donskoy' appeared opportunely on the eve of the Napoleonic War. Catherine herself tried her hand at the drama of manners, and by her example encouraged the creation of the satirical journals, in which Novikov was most prominent.

The first half of the 18th century did not

rise above an imitation of the French pseudo-classic school, but toward the end of the century the English influence, especially that of Addison, becomes more prominent. In 1790 there appeared Radishchev's 'Journey from Saint Petersburg to Moscow,' whose very title indicates its obligation to Sterne's 'Sentimental Journey,' and with it a spirit of liberalism, coupled with the sentimentality which held sway in the West, entered Russia. Of the poets of the time, who were also falling under Italian and Latin influence, the most prominent is Derzhavin, who bridges over from the 18th to the 19th century, and who, by his violent attack on the turgid ode of the preceding period, put an end to the slavish imitation of foreign models, and himself produced noteworthy poems. His 'Ode to the Deity' was translated into several languages and breathes an advanced Deism. Karamzin, who had lived in England, introduced the simpler English style into literature, and in his voluminous 'History of Russia,' in his sentimental novels, such as the famous 'Poor Liza,' and in his many sentimental poems, made the Russian language a perfect vehicle of thought. The romantic movement, then prevalent in Germany, had little effect upon Russia. Kamenev's romantic poems and Zhukovski's excellent translations from the German did not create a school in Russia.

The end of the 18th and the beginning of the 19th centuries are rich in talents who made the West accessible to Russia in all literary endeavors. The influence of the French fabulists, especially LaFontaine, is seen in Sumorokov, the dramatist, in the poet Maykov, in Izmaylov, but reaches its apogee in the genius Krylov, who entered the literary field with some mediocre comedies, but gained universal recognition by his a little more than 100 fables, less than two for each year of his life, because he was the first to place the foreign models in a distinctive Russian setting. The sentimentalism, which was introduced by Radishchev, found its continuators in a number of poets, among whom Kozlov (1779–1840) is probably the most talented. In Vyazemski (1792–1878) sentimentalism, which came otherwise to an end in the 40's, survived until the end of the 70's. These poets sang not only of solitude, but also of the gentle home associations and the awesome sentiment of religion in places sanctified by age, and thus they introduced the worship of antiquity, which found its expression in the laudation of Moscow and Kiev, and the holy places, and led to a series of poets, not distinctly sentimental, who may be denominated as the patriotic and religious poets. Thus Glinka (1788–1880) published a series, 'Spiritual Songs,' and Rylyeev (1796–1826), by his historical ballads, in which there breathes a spirit of liberty, incurred the suspicion of the government, and was one of the literary lights to fall a victim of the December Revolution. The Italian influence, especially that of Tasso, is discernible in Bätyushkov (1787–1855), whose 'The Dying Tasso' is a poem of unusual merit, but who unfortunately was lost to literature for the last 35 years of his life, having become hopelessly insane.

In the drama Griboyëdov (1795–1829) continued the tradition begun by Fonvizin and Kapnist, and his 'Intelligence Comes to Grief,' in which he mercilessly flayed the old order of things, the servility, militarism and superficiality which harked back to the days of Catherine, remained for a long time a classic on the stage. The romantic movement of the English type, which reveled in the past and in adventure under exotic conditions, appealed to the younger generation in the beginning of the 19th century, and some notable results were achieved. Bestuzhev (1797–1837), who himself led a Byronic existence, wrote some good novels of martial adventure, such as 'Ammalat Bek,' and the historical novels of Lazhechnikov (1794–1869), 'The Heretic,' 'The Last Noviks,' 'The Ice House,' have lately been resuscitated from oblivion and are read with pleasure. But the poets of this school, Pushkin (1799–1837) and Lermontov (1814–41) have gained the greatest reputation. Pushkin began his career with some extravagant romantic poems, but during his banishment to the Crimea and the Caucasus he found the proper setting for the Byronism which was then taking possession of the nation, and to this he gave utterance in 'The Bakhchisaray Fountain,' 'The Gypsies,' 'The Prisoner of the Caucasus,' etc. His masterpiece is 'Evgeni Onyegin,' a novel in verse, which is considered as the prototype of a long series of Russian novels, in which the Russian hero is discussed. He tried himself in the historical drama and produced 'Boris Godunov,' a splendid poem, which is hardly fit for the stage. Having devoted himself to historical studies, he wrote 'A History of the Pugachev Rebellion,' and on his investigation based a series of stories, of which 'The Captain's Daughter' is probably the best. Lermontov even surpassed Pushkin in the facility of his verse, but his career was cut short at the age of 27, when he had already produced several volumes. Besides a number of tunable songs, he wrote a number of romantic poems, of which 'The Demon' is the most notable. Of his prose tales the most important is 'The Hero of Our Time,' which, as the title indicates, is a continuation of the question created by Pushkin in his 'Evgeni Onyegin,' and the hero of this new novel is the same blasé type as created by the Byronic attitude of the time.

The first half of the 19th century was particularly rich in poets, and among them must especially be mentioned Koltsev (1808–42), because he followed out the suggestion made some time before by Delvig that the popular element should find a place in the artificial poetry, and created a series of scenes from the homely life of the peasant and laborer, which at once made the poetry accessible to the masses, who still read him. At the same time Gogol (1809–52) struck out in a similar direction, by depicting the life of his native Ukraine, and the sordid existence of the small officials. His short stories, 'The Mantle,' 'The Nose,' etc., were the forerunners of his own longer tales and of the whole mass of realistic stories with which Russian literature has enriched the world. His 'Dead Souls' shows his obligation to Cervantes, but the story, in which we get a series of pensketches of country people, is unique and true to life. His 'The Revizor,' the best-constructed comedy to be found anywhere, in which he depicted the rascality of town officials, has remained a classic

until the present, and his romantic stories, such as 'Taras Bulba,' are still enjoyed in Russia and abroad. Gogol is the last of the men of the new period of Russian literature, and his appearance is the more significant, since it is correlated with that of the critic Byelinski, the first of a series of writers who viewed the Russian world of letters as an organic whole and who attached themselves more especially to some prominent author of his time. It was Byelinski (1811–48) who created the name of "The Natural School" as a specific manifestation of literature in Russia and illustrated his conception with an analysis of Gogol's works.

With Byelinski begins the newest period of Russian literature, which during his activity is characterized by an attempt to find itself. The years 1848–55, that is, up to the Crimean War, are the period of the "Censorship Terror," when the new authors, Shchedrin, Turgenev, Nekrasov and others were crushed and literature has no conquests to record. The next six years have been denominated "The honeymoon of Russian progress." The *belles-lettres* become "accusing," the foundation for this type of didactic writing being laid by the humorous Saltykov-Shchedrin with his 'Provincial Sketches.' Everybody was interested in the burning questions of the day, hence the importance of Chernyshevski's (1828–89) 'What to Do?' in which he applied the acid test to the questions of life. Turgenev (1818–83), who had written his epoch-making 'Memoirs of a Hunter' at the end of the 40's, now developed his literary activity in his famous novels, 'Rudin,' 'A Nobleman's Nest,' and in 1861 expressed the struggle of two generations in his famous 'Fathers and Sons.' During the same period appeared Goncharov's (1812–91) 'Oblomov,' a novel of the "Russian hero" type, which brought out a detailed analysis of the characteristic Russian novel by the critic Dobrolyubov (1836–61). Pisemski (1820–81) produced his best novel, 'A Thousand Souls,' and his best drama, 'Bitter Fate,' in which he was still constructively active, and not destructively hostile to the manifestations of progress. Ostrovski (1822–86) wrote his "humane" drama, which culminated in 'The Storm' (1860). Only the poets did not fare well during these six years and the following period, because they continued the tradition of "art for art's sake," which was violently attacked by the critic Pisarev. Thus the admirable poems of Maykov (1821–97), Fet (1820–92), Tyutchev (1803–73), Mey (1822–62) and many others suffered almost complete oblivion, as did the historical novel, 'Prince Serebryany,' and the dramas in verse by Alexis Tolstoi (1817–75).

The first half of the 60's is an epoch of reaction and Nihilism. It was then that Pisarev (1841–68) developed his destructive criticism which led to the abandonment of art for art's sake and the enthronement of the "poetry of the people" by Nikitin (1824–61), which was developed in its fullest form by the people's idol Nekrasov (1818–77). The period of Nihilism brought forward a considerable number of writers from the middle and lower classes of society, who devoted all their energy to the peasants and the submerged. The most talented among these were Pomyalovski (1835–63), Nicholas Uspenski (1842–89), Levitov (1842–77), Ryeshetnikov (1841–71). To the same period belong the authoresses Marko-Vovchok (1830–1907) and Kokhanovskaya (1825–84), though they did not belong to the worshippers of "the people." The best novelist who dealt with the peasants was Slyeptsov (1836–78), whose masterpiece is 'Difficult Times.'

The 70's are denominated "the epoch of the highest development of altruism." In this period Saltykov-Shchedrin (1826–89) produced his masterly 'Family Golovlev' and 'Poshekhon Antiquity,' Dostoevski (1821–81), has 'Memoirs from the Deal House' and 'Crime and Punishment.' Although Dostoevski had been met with indifference in the 60's, he now was acclaimed, on account of his later writings, as a moral teacher "from whom one did not learn what to love, but only to love." Leo Tolstoi (1828–1910), who had equally been received coldly in the 60's, and whose 'Anna Karenin' was viewed merely as a novel of high life, now attracted universal attention by his 'Confession' and his religious writings. The period was rich in authors of less pronounced talent. Lavrov (1823–1900), around whom gathered the progressive elements, exerted a great influence with his historical writings, especially his 'Introduction to a History of Thought.' Mikhaylovski (1842–1902), by his enormous number of sociological critiques, in which he, in opposition to Spencer, tried to show that "the ideal" is the most important part of the historical personality in history, created a whole school of "idealizing" novelists, among whom the most prominent are Zlatovratski (1845–), Naumov (1828–1901), Nefedov (1848–1902). This also led to the narodnichestvo, "the worship of the masses," which resulted in a very great number of scientific essays on the condition of the peasant, among the writers of which the most noteworthy are Vorontsov and Engelhard, and in the field of *belles-lettres* Glyeb Uspenski (1840–1902), by far the most talented author who dealt with the peasant. Other noteworthy authors, who did not devote themselves to "the people," are Garshin (1855–88), who wrote some remarkable short stories, Minski (1855—), the translator of Homer, Potapenko (1856—) and Korolenko (1853—), whose charming stories have been widely translated, the melancholy Nadson (1862–87), "the poet of the struggle," Yakubovich (1860—), the novelist Boborykin (1836—), whose voluminous activity tried to seize the transient phase of life. A similar activity was developed by the novelists Sheller (1838–1900) and Stanyukevich (1844–1903), who preached an intelligent progressivism, which also led to the critical labors of Pypin (1833–1905), whose 'History of Russian Literature' is a work of the highest order. Among the great host of authors of that period may be mentioned Melnikov (1819–83), who devoted himself to the portraying of the dissenters, Lyeskov (1831–95), who at first wrote stories about Nihilists, and later from the sordid provincial life, Karazin (1848—), the Russian Fenimore Cooper, who depicted central Asiatic scenes, Nemirovich-Danchenko (1842—), the military novelist, Mamin-Sibiryak (1852—), who revels in Ural scenes.

The eighties have been denominated "the epoch of despair," which was ushered in by the Pobyedonostsev reaction. Pobyedonostsev

(1827–1907) despised all progress and crushed all free thought, hence the ensuing pessimism and weakness of will, as it appears chiefly in Chekhov's (1860–1904) short stories and dramas, and even Leo Tolstoi's mysticism and desire for self-perfection is ascribed to the disheartening condition of the political life in the last two decades of the 19th century. Among the large number of feuilleton writers of this period there stands out Amfiteatrov (1864—) as a champion of freedom, while others, like Menshikov (1859—) turned sordid opportunists, and Tikhomirov (1850—) became a violent reactionary. Another result of the suppression of free thought was the resurrection of "art for art's sake," and here we find the poet Fofanov (1862—), Andreevski (1847—), Apukhtin (1841–93), Golenishchev-Kutuzov (1848—). Far more genuine was Frug (1860—), who sang of his Jewish compatriots, under the oppressive sensations of the pogroms. The period was rich in women who made a place for themselves in literature, such as Shapir (1850—), Krestovskaya-Kartavtsevaya (1862—), Dmitrieva (1859—), who depicted scenes from peasant life.

The 90's are a period of regeneration, as the previous decade had been more properly a period of decadence. It is particularly marked by the growth of Marxian socialism, which finds its expression in a large number of scientific and popular treatises on political economy by Plekhanov (1857—), Tugan-Baranovski (1865—), Bulgakov (1871—), and especially Lenin, the leader of social democracy. In the *belles-lettres* this socialistic tendency was represented by Chirikov (1864—), Veresaev (1867—) and Pyeshkov (1869—), who writes under the pseudonym of Maxim Gorky. Chirikov later busied himself with psychological studies, while Veresaev gained his reputation by his merciless analysis of a physician's activity in his 'Memoirs of a Physician.' Gorki, who has risen from the slum to be the famous author of the slums, revels in bright colors and "through beauty arrives at truth." He is the most pronounced follower of Marxism, and, in the spirit of his master, despises alike the bourgeoisie and the peasant, saving all his sympathy for the submerged "who dare."

In 1897 Andreev, who was discovered by Gorki, began to write his gloomy stories, in which appear decadents, half-insane, neurotic characters. Since 1904 he has fallen prey to symbolism, although he still deals with realistic scenes. At the same time modernists made their appearance, who, like the poet Balmont and the novelist Merezhkovski, have taken for their subject beauty and not morality. In his trilogy, 'Julian the Apostate, Leonardo da Vinci' and 'Peter and Alexis,' Merezhkovski dealt with the conflict of Christianity with the Antichrist, taking his part with the latter. Hence he, in his critical essays on Tolstoi, condemned the author for his Christian meekness. Similarly Balmont has taken to poetry, in order to treat art for art's sake, thus reverting to the older school. The most talented poet of this new movement is Bryusov, who in a dispassionate way describes the passions and dissolving death. He has also written a number of fantastic stories, such as 'The Fiery Angel,' a story of mediæval witchcraft. Other modernists are the poet Ivanov, Blok and pessimistic Solugub. The latter has also distinguished himself in a number of novels, among which 'The Imp' is the best. A very prolific story-writer is Remizov, who portrays chiefly provincial scenes. It has not been possible to follow the literary activity in Russia since the beginning of the war, and nothing can be said of the outlook for the future.

Bibliography.— In the Russian language there are numerous aids to the study of its literature. One should consult the works of Aikhenvald, Arabazhin, Chukovski, Gornfeld, Milyukov, Morozov, Ovsyaniko-Kulikovski, Pypin, Skabichevski, Tikhonavov, Vengerov, A. N. Veselovski. Russian literature as a whole has been treated in English in the following works: Baring, M., 'Landmarks in Russian Literature' (New York 1910); 'An Outline of Russian Literature' (London and New York 1914); Brandes, G., 'Impressions of Russia' (New York 1889); Hapgood, I. F., 'A Survey of Russian Literature, with selections' (New York 1902); Kropotkin, P. A., 'Russian Literature' (New York 1905); Waliszewski, K., 'A History of Russian Literature' (New York 1900). There are the following collections in English: Bechhofer, C. E., 'A Russian Anthology in English' (London and New York 1917); Tollemache, B. L., 'Russian Sketches, Chiefly of Peasant Life' (London 1913); Wiener, L., 'Anthology of Russian Literature from the Earliest Period to the Present Time' (New York 1902–03); Newmarch, R., 'Poetry and Progress in Russia' (London 1907); Bianchi, M. G. D., 'Russian Lyrics, Songs of Cossack, Lover, Patriot and Peasant' (New York 1910); Bowing, Sir J., 'Specimens of the Russian Poets' (Boston 1822); Pollen, J., 'Russian Songs and Lyrics' (London 1916); Selver, P., 'Modern Russian Poetry' (London 1917). A number of poets and novelists are dealt with in *The Russian Review* (London 1912—).

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5. RUSSIAN DRAMA. In Russia, as in Greece, the drama arose from the commingling of the religious and secular elements. Mystery plays were imported through Poland and Kiev from western Europe and introduced into Moscow by Semyon Polotski in the time of Tsar Alexis (1645–76). Johann G. Gregori, a German Lutheran pastor, translated German mystery plays, and Dmitri Rostovski produced some akin to the moralities, in which Biblical characters were supplemented by allegorical personifications. The introduction of these crude beginnings was to some extent facilitated by the previous existence in Russia of religious ceremonies (*deistva*) having a slightly dramatic character. Gradually moral reflections and local touches were introduced into the religious dramas, Western plays of non-religious content were produced, French comedies (Molière), translated, and finally plays on Russian themes were staged. Four theatres are mentioned in Petrograd in Peter's time (1702–24).

Thus was paved the way for Sumarokov (1717–77), the first Russian literateur by profession, who in some 20 plays, imitations of Racine and Voltaire, popularized in Russia the *pseudo-classical* drama with its rigid "unities," and artificiality. The theatre now became firmly grounded and the profession of actor (Volkov, Dmitrevski) was established. This type of play remained extremely popular until the middle of the 19th century and still finds some favor. But the great wave of democracy which has been rolling over Europe since 1775, and which brought the French and American revolutions, the insurrections of 1848, the liberation of the American slaves and the Russian serfs, and which has at last culminated in the Russian Revolution and the plans for a League of Nations — this wave swept away the old drama and brought on its crest the modern *national, Russian Realistic Drama.*

Even as early as 1769 the Empress Catherine's favorite, D. I. von Visin, to a considerable extent abandoned the artificial ways of his predecessors. He represented contemporary life in a fairly faithful manner and gave his plays a direct social purpose — the satirizing of the effete nobility. He was followed by Krylov (the wonderful fable writer) with similar but inferior plays. During the entire first half of the 19th century (during which period the romantic school — represented by Lermontov's 'Demon,' — exercised a considerable temporary influence in Russia) only three important dramas approaching the newer type appeared: Griboedov's comedy 'Woe from Wit,' Gogol's comedy 'The Inspector' and Pushkin's tragedy 'Boris Godunov.' Although the first drew much from Molière's 'Misanthrope' and although the last bears considerable resemblance to Shakespeare's historical dramas, yet all are undoubtedly long steps in advance toward the realistic drama. This is particularly true of 'The Inspector.' In 1850 appeared the first of the 48 plays of Ostrovski, who is rightly regarded as the father of the national drama, since he not only developed its distinctive characteristics to a high degree but also won for it a permanent place on the Russian stage.

Ostrovski, in keeping with the democratic trend of contemporary thought, turns away from the nobility and the official classes, which up to his time had been the chief subjects of drama, and devotes himself to the large middle and lower classes of the Russian cities, particularly to the merchants of Moscow. He raised his voice against everything among them that stood as a bar to human liberty. In method and style he is frank, direct and simple. Simplicity is revealed in the plot, which offers a striking contrast to the relatively complex plots of most Western plays. Often there is scarcely any trace of a traditional plot. His plays are more like a series of pictures of daily life quietly unfolding, than like a series of unusual events combined with a view to revealing their complex interrelations and collisions of interests. There are comparatively few characters, sometimes astonishingly few (four, five or six), which precludes the massing of characters for striking effects upon the stage. Simplicity is revealed also in the language, which is the language of the people and not the stilted artificial language of the classic stage. The simplicity of Ostrovski's art also appears in the small amount of action on the stage and the relatively calm emotional tone that pervades his plays. Many Russians think that this is characteristic of modern life in general as contrasted with, for example, mediæval life; they believe that thought (reasoning) are coming to decide men's fortunes more than violence. In most Russian dramas at any rate, the actors appear and disappear without great bustle or excitement. They talk about the most ordinary events of life, the weather, the town gossip; yet little by little it becomes clear that these apparently trifling matters are really the most important of all, and that these people are passing their most critical days and deciding, though half unconsciously, questions that will determine, not only their own fortunes, but the future of society as well. "The comedy" (and tragedy) "of Ostrovski is not the comedy of intrigue or of character, but something quite new, which could be called the drama of life, if the term were not too wide and indefinite. I mean that throughout his plays he puts into the foreground the general conditions of life which are not dependent upon any of the characters of the play. He does not punish either the miscreant or the victim. They both arouse our pity, sometimes our mirth. But it is not upon them that our emotion centres. We see that their environment controls their actions, and that they have not the energy to oppose it. So the conflict demanded by the theory of the drama is not comprised in the dialogue, but in the conditions which control the characters. Often the characters have no appreciation of their own position or of this conflict. But the conflict goes on in the listener, who is incensed by the conditions of life that beget it."— Dobroliubov.

All these qualities of Ostrovski's art may be summed up in the word realism. But Russian realism is of a peculiar type, because the Russian writers are not simply realists; they are also intense idealists. Yet they understand that man cannot attain Utopia by mounting above the clouds on the golden wings of fancy. Though guided by his ideals, he must erect a staircase slowly and with toil out of acts of his daily life. Russian realism is a fusion of realism and idealism. Through its pictures of the realities of life shimmers life's religious, moral and social significance.

Contemporary with Ostrovski were Turgenev and Potekhin. The plays of the former, though inferior to his other writings, are of a high merit. Potekhin's plays, being outspokenly democratic, met serious opposition from the censor. Pisemski's, 'A Bitter Lot,' is the most effective peasant drama before Leo Tolstoi's 'The Power of Darkness.'

The chief writers of drama since Ostrovski are Chekhov, Gorki and Andreev. Chekhov, who was primarily a short story writer, wrote five regular plays and several short dramatic pieces. A few years ago statistics of the public libraries showed that he was the most widely read of Russian authors. In his plays he treats the middle and upper classes of the reactionary period of the age of reconstruction following the emancipation of the serfs. Only one of them, however, 'Ivanov,' was written in the earlier, more pessimistic period of his career. He is particularly remembered for the marvelous success of his 'Sea Gull' when it was staged by the Moscow Art Theatre of Stanis-

lavski, and for his contributions to the success of this theatre, which has had such an enormous influence over the western European stage. His realism was of so distinct a type that it struck even the Russians, who called him the «poet of *actuality*.»

Gorki said of himself, «I have come from below, from the nethermost ground of life, where is nought but smudge and murk. . . . I am the truthful voice of life, the harsh cry of those who still abide down there and who have let me come up to bear witness to their suffering.» This statement is not true to so great an extent of his dramas as of his stories, since there are in them many characters of the middle class, as for instance, in 'The Smug Citizen,' 'The Barbarians,' and even 'Enemies,' which deals with the labor problems. All of Gorki's plays are powerful — gripping, in fact.

Some of Andreev's plays, as 'Ekaterina Ivanovna,' 'Professor Storitsyn,' 'To the Stars,' 'Savva' and 'Days of our Life' follow the traditional type we have just been discussing, but he has also produced a number of symbolic dramas which is an entirely new type. One of these, 'The Life of Man,' has met with remarkable success on the stage, but others present enormous technical difficulties in presentation ('The Ocean' and 'The Black Maskers'), or were prohibited by the censor ('King Hunger'). Andreev represents, par excellence, the «tragedy of thought» mentioned above. Indeed, he has written one drama entitled 'Thought.' Andreev is second perhaps only to Dostoevski in his powers of psychological analysis, and few, it any, surpass him in power of vivid description. His style is at times impressionalistic in a remarkable degree, although he is equally at home with realism and symbolism.

The last three decades have brought forth many other meritorious writers of the drama in Russia. Yushkevich in his 'King Hunger' and 'Dina Glank' (also called 'The City') has drawn faithful pictures of the life of the Jews in Russia. Artsybashev produced a drama 'Jealously,' which for months was the sensation of the Russian intellectuals. Other writers of the drama are Chirikov, Nadson, Garin and Chulkov. Evreinov is less distinctly Russian.

The historical drama cannot be said to be a great success in Russia. Only a few patriotic dramas like Pushkin's 'Boris Godunov' and Alexis Tolstoi's trilogy 'Death of John the Terrible,' 'Czar Fedor Ioannovich,' 'Czar Boris,' dealing with the establishment of the house of the Romanovs, have occupied a prominent place on the stage. The reason is that in Russia, literature has served during the past century primarily as a guide to a philosophy of life and to the solution of life's practical problems. Hence it has dealt almost exclusively with contemporary life and has left the dead past to bury its dead.

Translations of Russian dramas into English (the names of the translators are in parentheses):

Andreev.—'To the Stars' (Goudis; in *Poet Lore*, 1907); 'Anathema' (Bernstein); 'Life of Man,' 'The Black Maskers' and 'The Sabine Women' (Meader and Scott); 'The Life of Man' (Hogarth); 'The Sabine Women' (Seltzer); 'Savva' (Seltzer); 'The Sorrows of Belgium' (Bernstein); 'King Hunger' (Kayden; in *Poet Lore*, 1911); 'Love for One's Neighbor' (Seltzer).

Chekhov (or Tchekoff).— 'The Sea Gull' (Eiseman; in *Poet Lore*, 1913); 'The Sea Gull' and 'The Cherry Orchard' (Calderon); 'The Sea Gull,' 'Ivanov,' 'Uncle Vania' and 'The Swan Song' (Fell); 'The Three Sisters,' 'The Cherry Orchard' and other plays (West); 'The Cherry Orchard' (Mandell); 'A Marriage Proposal' (Chambers, also by House); 'The Wedding and The Jubilee' (edited by Bechhofer).

Evreinov.— 'A Merry Death' and 'The Beautiful Despot' (edited by Bechhofer).

Gogol.—'The Revisor' (also called 'The Inspector-General,' Sykes); same (Mandell); same (Seltzer).

Gorki.— 'The Children of the Sun' (Wolfe; in *Poet Lore*, 1906); 'The Smug Citizen' (Hopkins; in *Poet Lore*, 1906); 'Summer Folk' (Delano; in *Poet Lore*, 1895); 'A Night's Lodging' (Hopkins; in *Poet Lore*, 1905); same separately under title 'Submerged'; same under title 'The Lower Depths' (Irving); same under the title 'In Lower Depths' (Chambers).

Griboedov.—'Gore ot uma' 'Woe from Wit' (Benardaky); also same under the title, 'The Misfortune of being Clever.'

Kossatch (pseudonym: *Lesya Ukrainka*). — 'The Babylonian Captivity' (from the Little Russian language by Volska).

Ostrovski.— 'The Storm' (Garnett); 'A Protégé of the Mistress,' 'Poverty is No Crime,' 'Sin and Sorrow Are Common to All,' and 'It's a Family Affair' (edited by Noyes).

Pushkin.—'The Statue Guest,' 'Mozart and Saglieri' and 'Boris Godunov' (Turner).

Tolstoi, Leo.— 'The Fruits of Culture' (L. and A. Maude; also by Wiener; by Schumm; by Dillon); 'The Power of Darkness' (L. and A. Maude; also by Wiener); 'The Living Corpse' (Wright); 'The Light That Shines in the Darkness' (Wright); 'The Cause of it All' (Wright); 'The First Distiller' (L. and A. Maude).

von Visin.—'The Choice of a Tutor' (edited by Bechhofer).

Bibliography.— Kropotkin, 'Ideals and Realities of Russian Literature'; Brueckner, 'A Literary History of Russia'; Waliszewski, 'Russian Literature.' Consult also introductions to the various translations.

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6. RUSSIAN ART. In studying Russian art we have to consider two distinct periods — the ancient and the modern. The ancient, which extends from the earliest origin to Peter I, is characterized by an imitation of Byzantine art imported into Russia from the South and partly from the West, and by the blending of the Byzantine and the Russian elements into an original type of art. The modern period, which begins with Peter I, is marked at first by a strong West-European influence, and later by a strict realism and the development of a typical Russian art.

The beginning of Russian art dates from the remotest times when the Slavs, who formed the Russian Empire, expressed their artistic instinct in their animal-like shaped instruments, in the reproduction of their gods, in their works of wood, stone, metal and pottery and in their decorations of household objects and clothes. The history of art properly begins, however, only with the time of Saint Vladimir. Immediately after the introduction of Christianity, Byzantine builders, painters, decorators and engravers were called to Russia to build churches and decorate them. The first stone churches in Kiev, the Vasilyevskaya and the Desyatinnaya, were built on the Byzantine model of the 10th century. This was an oblong rectangle with three apses on the eastern end of the building. The churches which were soon afterward built in the district of Kiev and in the two other church districts, Novgorod and Pskov, and Vladimir-Susdal, are all on the same style with only slight modifications. Both the churches in the district of Kiev and in the district of Vladimir-Susdal had the plan of a rectangle, which was almost square, and the form of a cube with two or three apses on the eastern end and a «drum» attached to the semicircular cupola in the middle of the building. The churches of the northern district, Novgorod and Pskov, were slightly different. They were polyhedral structures with the same system of cupolas in the centre, which was the general characteristic of the churches of the Peloponnesus and the Grecian Archipelago. The number of cupolas varied in the three districts from two to five. The «drum» was later changed, giving the cupola a belly-shape. However, only the stone churches built in residences of dukes in great cities and rich monasteries bore the Byzantine character. The wooden churches, of which there were many in the three church districts, were typically Russian. They were the work of Russian peasants and were built like the *izba* (hut) with the roof sloping down on both sides. The Russian churches began to lose their distinctive Byzantine character when Russian architecture came under the influence of the Italian Renaissance. The Lombard style had made itself felt already in the Vladimir-Sudal period. When Moscow became the capital, Fioraventi and other masters were called to Moscow at the close of the 15th century to erect there churches and public buildings. Though the churches of Vladimir were taken as a model, the churches assumed new characteristics with the ascendency of Moscow. Instead of the elementary type of belfry consisting of one or two arches covered with a simple span roof, lofty and elaborate bell towers decorate the Russian churches after the 15th century. Though churches of the Byzantine style still continued being built during the 16th, 17th and 18th centuries, the new type begins to appear in the middle of the 16th century. This type resulted from the combination of the Italian element and the national Russian style of the wooden churches. A great number of these churches appeared in Moscow in the middle of the 17th century. They were structures of unusual beauty which betrayed the originality and rich fancy of the Russian architects. The different models of the new style can be classified in three groups. The characteristic of the first is the tent-shaped roof of different styles. The second group are churches whose main body is a long parallelopiped, ending in two or three tent towers. The churches of the third group are cubes ornamented with domes varying in number from two to five.

At the end of the 17th century Russian architecture begins to come under the influence of West-European styles. The churches of that time have the old-established form with the decorations of the baroque style then prevalent in western Europe. The innovations of Peter I reflected in architecture just as well as in anything else a German taste, which, however, with the accession of the patriotic Empress Elizabeth was abolished in favor of the French. It was not until the middle of the 19th century that attempts were made to rescue native architecture from its peril. The first Russian architects who came into prominence only during the reign of Catherine II were A. Kokorinov, a pupil of Count Rastrelli, then in Russia; V. Bajenov and I. Sfarov. There was, however, yet no attempt made to restore distinctly national features in architecture. All of them had studied the pseudo-classical style and applied it to their productions. At the time of the construction of the Kazanski Sobar (cathedral of Kazan), which took place under Alexander I, the so-called imperial style was in vogue in Russia. This was the style which had developed in France under Napoleon I, who tried to compete in splendor with the emperors of ancient Rome. A great number of Roman porticos, frontals, façades, supported by colonnades, vast vaults in imitation of ancient rotundas and temples appeared all over in Petrograd and Moscow. The best illustration of the imperial style is the Stock Exchange in Petrograd, which is the production of the Frenchman, T. De-Tomon. Vas. Stassov, who had reached great prominence during the years 1820–30, devised a plan in which the Latin form of the cross and the decoration of the imperial style, five cupolas, were combined. This combination made the structures resemble the ancient Russian churches. Architectural activities were greatly spurred under Nicholas I, who was a great lover of art. However, the freedom of the artist was greatly hampered as architecture assumed an official character. The greater number of state and public buildings were constructed at the order of Nicholas I who entrusted with this work mainly Ton and Brullov. Russian architecture is indebted to Ton for the revival of its national element and his first attempt to restore it by turning the attention of the Russian architects to old Russian art. The tendency to return to the Byzantine and ancient Russian styles became more pronounced under Alexander II when the new spirit of reform allowed greater freedom in art.

The embellishments of the churches were mosaic works, frescoes and ikons which represented saints and prophets, complete episodes of the life of Christ and the feasts of the Byzantine emperors.

Iconography was for a long time strictly Byzantine in character. The first sacred pictures were imported into Russia from Byzantium. The earliest ikons at Novgorod and Kiev were productions of Greek painters.

There practically was no school of native painters until the 12th century. The teachers in the schools were Greek masters and the Russians who studied with them only copied the Greek style. Soon, however, as early as the 13th century, Novgorod, one of the centres of inconography, began to produce painters who showed ability and originality. The Russians, however, never reached any great distinction in this art, being hindered in their development by the restrictions imposed by the Orthodox church. Despite the efforts of the ecclesiastical authorities to keep this art within the limits of tradition, the schools of Moscow and Taroslav began from the 17th century onward to be influenced by Western tendencies. The school of Pskov showed Italian influence already in the 16th century. Iconography lost much of its national character. The style of the Novgorodian school, the leading style until far into the 15th century, which was remarkable for its vividness and touch of naturalism, and that of the Pskov school, which differed only in peculiarities of coloring, lost many of their good qualities with the ascendency of Moscow. The art of iconography became poor and remained undeveloped.

The decorative art on the whole dates from very early ages. At first it was only an imitation of the Byzantine but later in the 16th and 17th centuries, under foreign influence, it formed a peculiar style of its own, marked by an astounding originality, diversity and beauty. It combined West-European, Asiatic, Byzantine and national elements. The most characteristic Russian designs are geometrical patterns and fanciful representations of birds, animals and floral motifs. A very common style is that of climbing plants, such as vine, or ribbon-like strips interlacing in fanciful ways, forming different angles and ending with griffons and other fantastical animals and even human faces. Usually more than one color is used.

In the beginning of the 18th century due to the reforms of Peter I, Russian art assumed distinctly foreign character. Peter I, believing in the usefulness of art, sent a good many men for training abroad and also invited to Russia foreign masters, such as Trezzini, Brandt and K. V. Rastrelli, Sr. Though Elizabeth was patriotic and preferred everything Russian, she was compelled to invite foreign artists, such as De Rotarri, for there were yet no prominent Russian artists, due to inadequate means for good training. Later in 1757, at the suggestion of Shuvalov, an academy of art for the training of native artists was established. However, Russian art continued to be imitative in character, for the teachers at the academy were foreign artists. Moreover, the most gifted pupils of the academy were sent abroad for six years to complete their studies there.

The history of modern Russian painting dates from the establishment of the Russian school of painting which practically begins with A. Losenko. He received his training in France, and as professor and, later, director of the academy, he is greatly responsible for the foreign direction which Russian art took and preserved for a long time. The close imitation of ancient forms and Italian art of the times of the eclectics, conventionality in colors and observation of prescribed rules made Russian work of art of those days betray poor fancy and routine. The artistic productions of Losenko's followers lack originality and national character. They treat themes from holy history, ancient history, mythology or allegory, represented on the French or Italian style. Rarely were themes taken from Russian history. G. Ugriumov and A. Ivanov, the teacher of Brullov, rank as the first prominent Russian historical painters.

The first to part with the traditions of the academy was Brullov, whose picture 'Last Days of Pompeii' appeared while the pupils of Ugriumov still strictly adhered to academic classicism. Though the 'Last Days of Pompei' combined classicism and romanticism, then prevalent in western Europe, it threw off the shackles of academic routine and first opened the way to free creation. Next to Brullov the path of freedom in artistic production was entered upon by P. Basin and Th. Bruni. Russian art became more successful with the artists' disposal of ancient gods and heroes for the sake of episodes from ancient Russian history, which they treated in a simple and natural way. This change marks the beginning of the "National Historical Genre." The originators of genre were graduates of the academy during the years following 1860. The most famous of these were P. Chistyakov, G. Myasoyedov, N. Shustov, K. Flavitzki, H. Litovchenko, K. Makovski, V. Shvartz, N. Ge, V. Jacobi, V. Perov, U. Rilpin. The first to attempt genre was A. Venetianov. The subject matter of the genre style were pictures from everyday life, such as 'Evening-Meetings,' 'A Hunter with his Flock,' 'Travelers Caught in a Storm,' 'Scenes of Provincial Life.' In the 18th century portrait painting became very prominent and there was almost no painter of genre who did not paint portraits also. At a time of growth of wealth, followed by vanity on one hand and servility on the other, there was a great demand for portraits. And such artists as Kozlov, Ugriumov and A. Rimov responded. After Brullov's death Zarianko and Nakarov ranked as first portrait painters. Though after Venetianov the realistic painters began to produce portraits depicting Italian and Eastern life, nationalistic ideas had penetrated the public and they demanded the representation of the real life of their native country. The realization of this ideal in art was made possible by the reforms achieved by Alexander II. The first to respond to this public demand was P. Fedatov, a fine observer and witty satirist, who very successfully represented both the funny and the sad sides of contemporary Russian life. The realism of genre assumed a journalistic character. Its purpose was to attack and correct social defects. Art of the genre style, just as well as literature and politics of that time, was to play a part in bringing about reforms. The interest of the public backed this tendency. Famous artists of this group formed in 1872 a "Society of Movable Artistic Expositions" to bring to the attention of the public the existing social and political evils.

Genre was followed by landscape painting. At the head of a great number of landscape painters stands Schedrue whose influence on this phase of painting would have been still greater, if he had not spent a great part of his short life abroad painting Italian sceneries of the Neapolitan coast. A famous contemporary of his was M. Ivanov. The most prominent landscape painter, however, was Th. Aleksyexev whose specialty was perspective views of large cities. Russian landscape painting was at first, in the 18th century, only an imitation of foreign models. Following the foreign artist, the Russian painters did not depict nature as it actually is, but represented it perfectly lifeless, depriving it of all its contingencies and defects and giving it an artificial coloring. The Russian landscape painting, however, gradually lost its conventional traits, and during the reign of Alexander II assumed a national character. I. Shishkin reproduced the native forests; V. Onlovski painted Russian fields, seas and groves; M. K. Klodt depicted his native villages. However, Russian landscape painters did not escape the influence of decadence and impressionism of western Europe, which of late made itself felt in the Russian landscape.

Engraving sprang up together with the introduction of printing in the middle of the 16th century. At first wood engraving was not a separate art, wood cuts being used merely for the illustration of prayer books and other religious books, but later, in the 17th and 18th centuries, it developed into xylography. Though this art was practised in Russia for 150 years, no great artistic work was produced, and it later degenerated into plain factory work.

Metal engraving began in Russia as early as the 12th century, when it was first used for the decoration of evangelic books, cases of ikons and of different articles for church and home use. Copper plates, however, were first used in Moscow only in 1647, the engraving being made after the drawing by Gregory Blagoushin. The art of engraving was studied in Orouzhenaya Palata (school of the Orouzhenaya Palace), and the graduates of the school, artists like A. Gerkov, G. Kachalov, E. Vinogradov, were masters of their profession who in the excellence of their work could easily compete with the best foreign engravers. The most famous Russian engraver was E. Chemessov, a pupil of Schmidt. The art of engraving was already declining when Peter I, who liked to see his heroic deeds and accomplishments perpetuated, called to Russia foreign masters to train Russian engravers, and in the 18th century a great many engravings were produced, which were pictures of court life or portraits of high personages. In the beginning of the 20th century the themes of the Russian engravers were also historical subjects and landscapes. With the invention of photography and the revival of wood cuts in 1840, metal engraving went out of existence. Only *eaux-fortes* was continued in which Russian artists had become interested in the 19th century when water-coloring was much appreciated in western Europe.

Sculpture practically did not exist until the time of Peter I, for statues of religious personages with the exception of that of Saint Nicholas were forbidden by the Orthodox Church. In modern times it has been only an imitation of Greek sculpture deprived of all national characteristics. Within the last century there has been a tendency to rid it of the classical traditions, but with little success. Even in the works of prominent sculptors like Antokolski who reproduced mainly Russian historical persons and episodes of Russian history, the classical element is quite prominent.

With the exception of sculpture all phases of art have been developing in Russia along nationalistic lines since Alexander II. In recent years a regeneration of Russian art took place, the religious aspect becoming in it very prominent. Art became permeated with ideals such as expressed by Tolstoi in his "What is Art," where he states that the task of the artist is to express in his creations his highest and best sensations; and sensations are highest and best only when they coincide with the religious conception of goodness. Not beauty but goodness is the underlying idea of art, and the purpose of the artist is to convey it to others. The ideals of great modern artists, such as the Jew Antokolski, the naturalist P. Troubetzkoi, and the realist Vereschagin coincide with Tolstoi's religious revelry. The later's war pictures agitate against war as anti-Christian.

Consult Benois, A., 'The Russian School of Painting' (New York 1916); Duc, E. V. le, 'L'art russe, ses origines, etc.' (Paris 1877); Holme, C. (ed.), 'Peasant Art in Russia' (*International Studio*, special autumn number, 1912); id., 'Some Notes on Modern Russian Art' (R. Newmarch, December 1903); id., 'Modern Russian Art: Some leading Painters of Moscow' (May 1904); ib., 'Russian Art and American' (W. G. Peckham, June 1914); ib., 'Three Russian Painters — Somoff, Grabar and Maliavine' (V. Pica, December 1913); Martinoff, 'Anciens monuments des environs de Moscou' (Moscow 1889); Newmarch, Mrs. Rosa, 'The Russian Arts' (New York 1916); Ramesanov, 'Materialen Zur Geschichte der Kunst in Russland' (Moscow 1863); Rikliter, 'Monuments of Ancient Russian Architecture' (1850); Snow, F. H., 'Ten Centuries of Russian Art' (*Art World*, November, December 1916); Sobko, N. P., 'Lexikon russischer Künstler des 11ten bis 19ten Jahrhundert' (Petrograd 1873).

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7. RUSSIAN ARCHITECTURE. The most cursory survey of the history of Russia, as summarized in the article Russia (q.v.), should suffice to explain why Russian architecture is not comparable in extent and importance with that of western Europe, on the one hand, or of the great Moslem and Indian empires on the other. Not until the 9th century does Russia appear as a recognizable entity, and until the 16th the chaos of peoples and political institutions, the conquest by the Mongol Khans in the 13th, the incessant struggles of rival princes, kings or tsars against the Khans and against each other, the complete absence of any racial or national unity, the lack of roads and the dense ignorance of the masses, made impossible the development of any real civilization out of which alone a great architecture could spring. The first civilizing influence was the conversion to Christianity in 988 of Saint Vladimir

the Great, who made Kiev the seat of a metropolitan of the Greek faith, and brought the empire under the Byzantine influence. At the end of the 14th century, however, Moscow emerged as the political and religious capital of Russia, was enriched with churches and palaces of great splendor, especially in the citadel called the Kremlin, and remained the capital under the early Romanoffs until in 1703 Peter the Great built his new capital Saint Petersburg (now Petrograd) upon the Neva and began the imposition upon his empire of Western ideas and Western architecture.

We may accordingly divide Russian architecture into two main periods; the first from about 1389 to 1703, occupied chiefly with the erection of ecclesiastical buildings in a style derived from the Byzantine; and from 1703 to the present time, during which period the churches with some exceptions have continued to be built in the Russo-Byzantine style, while palaces and civic buildings generally have followed the modern neo-classic tendencies. Moscow is the important centre for examples of the first period, Petrograd for those of the second; but cities like Kiev, Nijni-Novgorod and Yaroslav also possess interesting examples of both.

In all Russian architecture there is an element of semi-barbaric Asiatic taste, which imparts a distinct character alike to the older and the newer monuments. This is especially conspicuous in the Kremlin or citadel at Moscow, within whose nearly triangular enclosure is an extraordinary group of churches, cathedrals (for in Russia there may be any number of cathedrals in one city, dedicated to different names or saints), towers, convents, palaces, museums and an arsenal; the earliest buildings dating from the late 15th century, the latest from the middle of the 19th century. The fantastic turrets, lanterns, bulbous domes, gilded and brilliantly colored roofs, and singular decorations suggest a mixture of Tartar, Byzantine and Italian Baroque influences, while in some churches the multiplied repetition of certain details suggests even the Brahman monuments of India.

The religious monuments of the First Period are best studied at Kiev and Moscow. The earliest churches, built of wood, are no longer standing; the first church of stone and brick, that of the Tithes at Kiev, built in 989, has also disappeared. While parts of some existing churches may date as far back as 1020–37, as in the cathedral of Saint Sophia at Kiev which has 15 domes and whose interior retains very ancient mosaics of Byzantine style, nearly all have been so often rebuilt entirely or greatly altered in much later years that little is to be seen that is older than the late 15th century. The churches are all built on a small scale of parts, often with four interior piers forming nine bays, each covered by a domical vault or a very lofty lantern or drum carrying a bulbous dome, or a spire tipped with a huge bulbous final. These lanterns are the extreme development of the late Byzantine dome on a drum seen in the churches of Salonika and Athens, and reach the extreme of fantastic extravagance of splendor in the cathedral of Saint Basil (Vasili Blajenoy) just outside the Spasskaia Gate of the Kremlin at Moscow, built 1554 by Ivan the Terrible, with eight lanterns and a huge central spire. The Uspensky Cathedral at Moscow (cathedral of the Assumption) rebuilt in 1473 by Fioraventi of Bologna has five simpler domes; the church of the Devitchy convent in the Kremlin has five bulbous domes. Of secular buildings of this period the most striking at Moscow are the Ivan Veliki tower of Ivan the Great, finished in 1600 by Boris Godunov, the tower over the Spasskaia Gate, and the Granovitaia or lesser palace, 1473–90, by Italian architects in the Renaissance style, but restored in 1882, and now serving as a banquet hall.

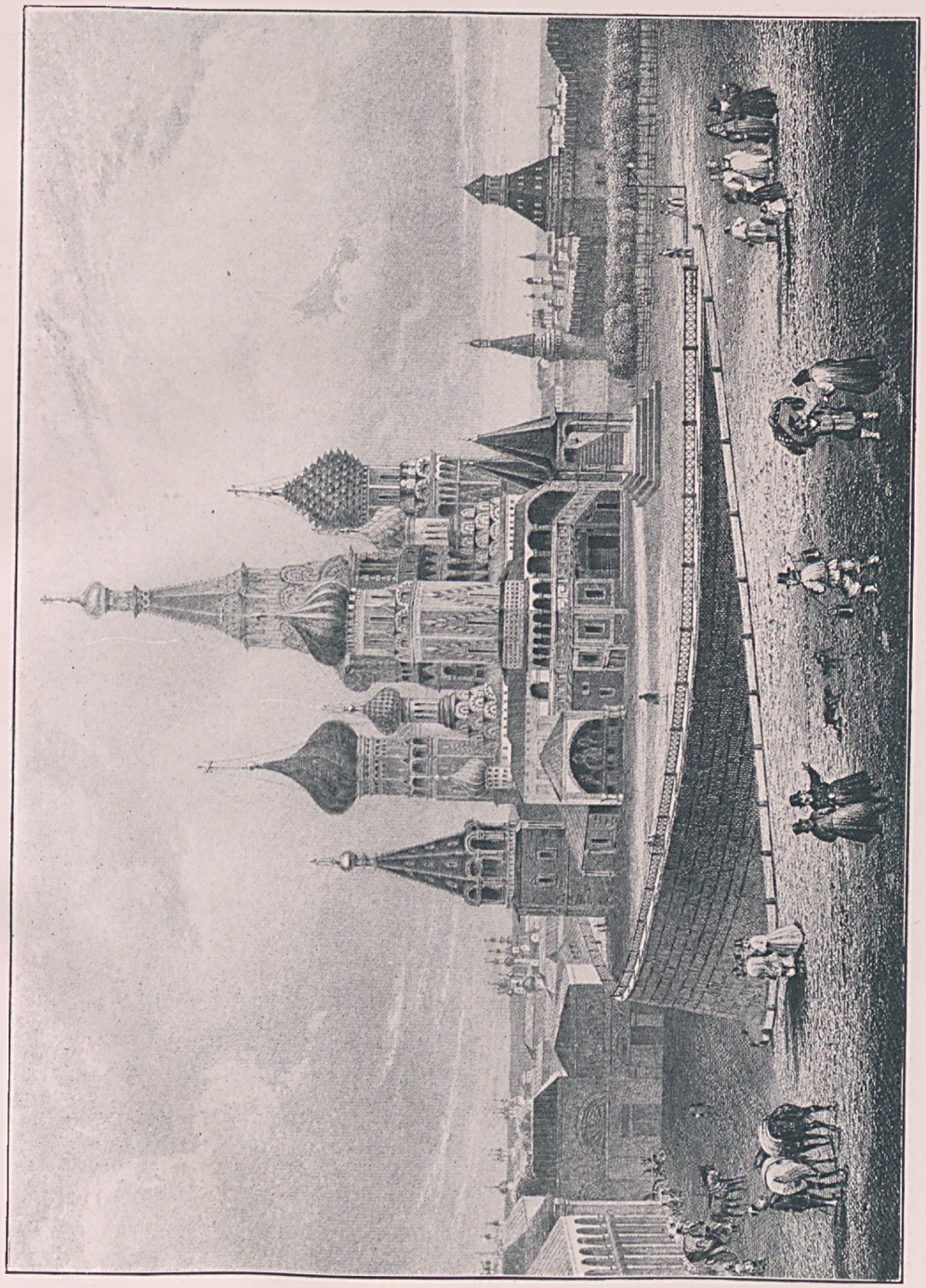
Of the Second Period the chief examples are at Petrograd. The civic buildings comprise the Admiralty (1727–35), the famous Winter Palace by Rastrelle (1732), the Stroganov Palace by the same, the Tauride Palace by Starov (1783), the Imperial Library by Sokolov (1794–1830), the National Museum by Rossi (1819–25) and the Alexandra Theatre (Rossi, 1832); nearly all these in a Russianized version of the Italian Baroque, in many parts displaying, especially in the interior decorations, the mixed Russian inheritance of Byzantine and Asiatic taste for showy effects. The Hermitage, by von Klenze, is in the neo-Greek style, more restrained in composition and detail. But the two most striking monuments are the two cathedrals: that of the Virgin of Kazan by Woronikine (1801–11) in classic style with a bronze dome and semi-circular colonnade, and the impressive cruciform cathedral of Saint Isaac by de Montferrand (1819–58) with a vast iron dome, and internally splendid in its finish of marble and malachite; it is in a strictly classical style, and is reputed to have cost $15,000,000. The cathedral of Saint Vladimir at Kiev is a more recent work in the Russo-Byzantine style, by Beretti and Bernhardt. Consult 'Monuments de l'architecture russe' (Saint Petersburg 1895–1900); Viollet-le-Duc, E., 'L'Art russe' (Paris 1877).

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8. RUSSIAN MUSIC. The music produced by the Russian people, whether in the form of the primitive and spontaneous folk-songs or in the various art forms developed by individual composers. It includes, in other words, all the music possessing sufficient Russian characteristics that has sprung up on Russian soil or that has been composed by Russian composers, whether in the strictly nationalist spirit of Glinka and Dargomyzhsky or in the more Western vein of Rubinstein and Tchaikovsky.

The historical development of Russian music reflects, in a large measure, the vicissitudes of Russia's general and cultural evolution. In her musical evolution, as in her general history, Russia has had her centuries of semi-Asiatic seclusion, her sporadic waves of Western influence, her periods of vigorous nationalism, and her days of cosmopolitanism or eclecticism. While it is manifestly impossible to draw exact parallels, it will greatly help the reader to grasp the general outlines of Russian musical history to bear this analogy in mind as he reads this article.

There are various ways of dividing and subdividing the periods composing Russia's musical history. Four general divisions are perhaps as logical as any. These may be desig-



The Cathedral of Saint Basil, Moscow

nated as (1) *The Primitive Period,* (2) *The Byzantine Period,* (3) *The Period of Transition,* and (4) *The Modern Period.* The first embraces Russia's musical history from earliest times to the introduction of Christianity; the second, the seven centuries following that significant event; the third, the 18th century; and the fourth, the great period from Glinka to the present day.

The Primitive Period.—Although the limits of the earliest period of Russian music cannot be determined with any definiteness, it is known to have been a long and important one. There is abundant circumstantial evidence to show that music figured considerably in the life of the Wends (Slavic tribes of the Western group) as early as the 6th century. That it was known to and practised by other Slavonic tribes much earlier seems quite probable. Early chronicles, and especially the numerous epic songs of Russia (the "byliny"), prove conclusively that, in peace and war, music never failed to thrill the primitive Slavs, whose greatest pleasure it was at home and on their wanderings.

The period of ancient Russia music, like the earliest beginnings of music generally, comprised chiefly songs — folksongs — whose professional promoters were the "Skomorokhi," those wandering minstrels ("Merry Andrews," the Russians fondly called them) who were both the composers and the preservers of Russia's precious old songs and epics. This early band of minstrels, which included the great Bayan, seems to have branched out later into several divisions, each performing a somewhat different musical function and all having their modern — naturally much modernized — representatives in Russia to this day. Originally, however, there were only two classes of these wandering musicians: straight musicians, who sang or played on the primitive Russian harp, "gusslia," and those who did other than musical stunts (like juggling) for the diversion of the people. As the latter were called by the name "Skomorokhi" (a word of dubious origin and etymology), there came in the course of time to be many kinds of Skomorokhi, corresponding to their diverse ways of entertaining. Without enumerating all these, it may be well to add, before dismissing this part of the subject, that these wandering minstrels either sang the legendary or heroic songs of ancient Russia, played for dancing, or acted as buffoons or entertainers. That they were much more than a transitory factor in the life of ancient Russia is shown by the fact that, despite centuries of persecution by the Byzantine Church, none of the general types of Skomorokhi ever became quite extinct. The bards ultimately became poets or poetasters; the musical performers developed into orchestral musicians; while the crude entertainers eventually became regular actors.

So much for Russian primitive music and the musicians who performed, preserved and developed it. The third factor to be considered in this part of our survey is the subject of primitive Russian musical instruments. There were many of these "folk-instruments," whose origin is as obscure as that of the Russian folksongs themselves. Owing to Russia's long isolation from cultural (Western) influences, as well as to the ban put upon tolksongs and secular instrumental music by the Protestant Russian Church, Russian musical instruments were not developed and perfected as were those of western Europe. The most important of them were: (1) STRING INSTRUMENTS — the *gussli* (several varieties of horizontal harps, having from 7 to 13 strings), the *dombra* (a guitar-like instrument), the *bandura* (a large instrument having 8 to 20 strings, which has supplanted the more primitive *kobza*), and the *balalaika* (a triangular, long-necked instrument having originally two but now usually three strings); (2) WOODWIND INSTRUMENTS — the *zhalaika* (a reed pipe with six sound stops), the *svirel* (a very simple piped instrument), the *surna* (a shrill pipe of Oriental origin), the *rozhok* (a simple horn-shaped instrument with six stops), and the *dudka* (a form of bagpipe); (3) PERCUSSION INSTRUMENTS — the *buben* (tambourine), the *lozhki* (wooden cymbals) and the *nakry* (kettledrums). Most of these primitive instruments are still used in provincial Russia, and many of them have been so far perfected as to become orchestral instruments. The most notable instance of such use in very recent times is V. V. Andreyev's, in his famous Balalaika Orchestra (composed of some 30 pieces of the kind just described, without any bowed instruments), which has toured both Europe and America, rendering mostly Russian folksongs or music of a similarly light and simple character.

The Byzantine Period.— The highest development of the primitive national period of Russian music — the great folksong period — was reached toward the close of the 10th century, in the reign of Vladimir I (980–1015), the first Christian prince of Russia. With the introduction of Christianity into Russia, a long period of decadence set in for Russian folksong, as for all other kinds of national popular diversion and entertainment. The priests of the new faith, in a spirit of truly mediæval asceticism, waged relentless warfare against the un-Christian spirit of the Slavonic songs and legends they found in the land of the erstwhile pagans. Watching zealously over the social and domestic life of the newly converted nation, the Byzantine Church proscribed all folksinging and persecuted its protégés, the Skomorokhi. But so dear were these folk-melodies to the hearts of the Russian people that even such constant persecution, much as it hindered their national development, could not entirely arrest their growth. It was those very Skomorokhi, or gleemen, whom we have just mentioned, that kept alive the spirit of folksong in Russia during centuries of Christian persecution. Taking refuge in the woods and remote villages, these wandering minstrels entertained and diverted their eager audiences pretty much as of old. The rich Russian nobles, moreover, persisted in maintaining, openly or secretly, their customary retinues of minstrels, despite clerical bans and displeasure. But, in the course of time, a new kind of song developed, a kind of song in which the earlier pagan sentiments were tempered with Christian. Being less spontaneous than the earlier folksongs, this curious conglomeration — and it seems to have been no more than that — was neither as pure nor as musical. With this de-

terioration of song came, naturally, a deterioration of the minstrels who sang it. The «spiritual» songs which the Russian gleemen seem to have invented at this time were neither a thing of beauty nor a joy forever. They were frankly and patently a substitute — and a very poor one at that — for the primitive but delightful folktunes, which were to remain submerged for centuries.

But the influence of the Church of this period on Russian music was not only negative. The Byzantine priests brought with them from the East a number of old church songs. In the 11th century, too, Greek singers introduced the Greek musical system into Russia. Soon music schools sprang up in various parts of Russia — at Smolensk, at Novgorod, and elsewhere — in which this system was studied and popularized. Gradually interest in church music spread, and the laity also learned to know and care for it. In the 12th century, if not earlier, efforts were made at chanting, which in the early days constituted the whole of the liturgic music. This was modeled more and more upon the famous Gregorian chant, while parallel texts accompanied the music notes — one in Greek and another in Slavonic (church Slavonic, to be sure). The Greek and Slavonic systems of notation, too, were long rivals, the former prevailing well into the middle of the 13th century. The greatest promoters of church music in Russia have been its tsars, who have maintained regular church choirs ever since the 15th century. It was out of these church choirs, constantly improved and augmented, that finally developed the now world-renowned Choir of the Imperial Chapel.

Among those who had done most to develop and perfect Russian church music were M. S. Beriozovsky (1745–77), perhaps the greatest Russian composer of sacred music; D. S. Bortiansky (1751–1825), a most gifted composer, who has done more than anyone else to perfect the above-mentioned Imperial Chapel Choir and whom the Russians have aptly named «the Russian Palestrina»; A. Lvov (1799–1836), composer of much meritorious music, but especially famous as the author of the Russian national anthem, and Degtiarev (1766–1813), composer of much interesting church music as well as of the secular oratorio, 'The Deliverance of Russia in 1612.' Excellent collected editions of liturgical music of the Russian Church, variously harmonized, have been published at Petrograd under the auspices of the Imperial Chapel. Two ancient musical grammars, published in facsimile, are also available. There are any number of works on the subject of Russian church music.

The Period of Transition.— The salutary influences of church music just referred to came long after the Byzantine period. They were mentioned under the preceding section merely for completeness. As a matter of fact, the dominance of Byzantine music in Russia ended soon after Western influences began to reach it, first through Kiev in the 17th century and next through Saint Petersburg in the 18th century. It was in the reign of Tsar Alexey Mikhailovitch (1645–76), Peter the Great's father, that the influx of foreign culture into Russia first began. Naturally, music was among the arts affected. Following European fashion, court choirs and orchestras came into vogue. The wandering minstrels of old (the oft-mentioned Skomorokhi), hitherto banished and persecuted by the overzealous Church, now became regular musicians and actors. The nobility, imitating the court, also now began to maintain their private little bands of musicians. Later these would give public performances, and thus musical interest was being stimulated by various agencies. When, finally, toward the end of Alexey Mikhailovitch's reign, the old ban on folksongs and secular music generally was lifted, the glory of Russian folksong — much dimmed, it is true, by centuries of disuse and somewhat denatured by the long-prevalent Byzantine music — once more returned to the land.

But conditions generally did not yet favor Russia's spiritual awakening, which followed the era of Westernization ushered in by Peter the Great (1689–1725). Nor did the change come all at once even then. It was impossible for Peter's numerous reforms to make themselves felt so quickly in any field. Certainly music was one of the last things to have throbbed with the new life that then began to stir sluggish Russia. It would seem that, with the multitude of political and social reforms claiming constant attention in the reign of this sovereign, the arts suffered proportionately greater neglect. At any rate, during Peter's reign music remained but a diversion of the court — an aid to the lustre of social functions, etc.— for Peter himself is said to have found as little pleasure in opera and comedy as in the chase. His tastes were only for church music. According to a reliable musical historian (Korb), as late as 1698 music was still only an accompaniment to various occasional feasts and celebrations in the homes of nobles, wealthy merchants, and German officers residing in Russia. Native Russian musicians were still too scarce in 1702 to make up the small orchestra of the Moscow Theatre without importing men from Hamburg. And the orchestras of that day were very small. Even court orchestras did not exceed 20 instruments, chiefly brass. Nor did their musical efforts have any artistic merit. Even military music of a very crude character did not find its way into Russia before 1704, after which it came to be used at funerals. As to folksongs, the court and society generally evinced no particular fondness for them, despite the new lease of life given to them in 1722 by Peter's ukase permitting popular musical diversions on certain Church holidays.

But greater musical progress was made in Russia under Peter's successors, Anna Ivanovna and Elizabetha Petrovna. It was under the former that Italian opera first appeared in Russia (1735). The event and date have great historical significance because they mark the beginning of a long period of foreign (chiefly Italian) operatic influence, from which Russia did not fully emerge for over a century. According to Vladimir Stassov, a famous Russian musical critic and historian, the first Italian opera produced in Russia was Francesco Araja's 'Albiazar,' conducted by its Italian composer, who was court kapellmeister under both Empress Anna and Elizabeth. Other foreign operas, mostly the work of the same composer, followed in rapid succession. But none of them had anything Russian to recommend them, although several composers tried persistently to give to their non-Russian works some Russian flavor. Thus the above-mentioned Araja produced an opera in 1755 ('Cephalus and Procius') which was written to a Russianized libretto and which was the first opera sung in Russia in the vernacular.

During Elizabeth's reign music in Russia became a fad, if not a veritable craze, every wealthy merchant aping the court fashion by organizing private musical bands and choirs. It was then, chiefly through the influence of Count Razumovsky (immortalized by Beethoven) that Russian folktunes came into vogue again. Araja and others started to introduce them into their operas. Thus appeared for the first time instrumental music which used and artistically developed Russian folksong themes. Under such favorable circumstances, native Russian singers and even composers developed. Besides the famous composers of church music mentioned in the preceding section, there were F. G. Volkov (1729–63), the eminent Russian actor, whose opera 'Tanyuska' (said to have been first performed in 1756) was the first all-Russian opera produced in Russia; and E. P. Fomin (1741–1800), a prolific composer of operas, whose 'Anyuta' (produced in 1772) comes much closer even than Volkov's work to having been one of the precursors of genuine Russian opera. The historical importance of such compositions becomes more obvious if we bear in mind the fact that most of the foreign «operas» of those days were really only series of more or less successful musical vaudeville acts.

Still greater musical progress was made in Russia under Catherine the Great, who was the first Russian ruler to give serious attention to general musical education. In her reign the study of music was introduced into girls' schools, while a student orchestra was organized at the Moscow University. Musicales became frequent and musical clubs multiplied, both factors exerting incalculable influence upon Russia's musical development. Temporarily halted in the reign of Catherine's successor, who entangled Russia in a war with France, this development received a new stimulus from the spirit of nationalism which followed the great Napoleonic defeat of 1812. Russia was determined to shake herself free, as it were, from foreign fashions and influences, which had long hindered her independent national development, in music as in other things.

Naturally, such a task could not be accomplished all at once. Persistent and numerous attempts in this direction were made with varying degrees of success by such composers as Titov (1800–76), Aliabiev (1802–52), Varlamov (1801–51), Gurilev (1802–56), Vielgorsky (1788–1856), Verstovsky (1799–1862) and, especially, the very prolific Venetian composer residing in Russia, Catterino Cavos (1776–1840), who rendered particularly great service to the Russian music-drama. Though the musical education of most of these composers had been too German-Italian to enable them to write music that should be truly and fully Russian, the work of this group of «pre-nationalists» or «pseudo-nationalists,» as it has been variously called, certainly paved the way for the great Glinka, the first truly national Russian composer, with whom modern Russian music really began.

The Modern Period.— Hardly any period of Russian music illustrates better than the modern the principle, referred to at the beginning of this survey, that Russia's cultural and artistic development practically reflects the general course of her eventful history. The new and vigorous impulse given to Russian life and thought by the pregnant events of 1812 — an impulse making for thoroughgoing nationalism — found its expression in the field of music, no less than in science, art and literature. Not only did the first quarter of the 19th century witness a still greater development of opera in Russia, but orchestral music first received serious attention and systematic study there. The great classical composers, from Bach to Beethoven, were introduced to Russian audiences between 1802–19 by the assiduous efforts of the Russian Philharmonic Society, the oldest Russian organization of its kind, founded in 1802. Besides, orchestral concerts given by various educational institutions (with the participation of their students) supplied more popular musical diversion. That the musical public grew rapidly in those days, Glinka himself tells us. The general elation caused by the sudden victory of 1812 spurred on even Russian composers to new efforts; and we have, as a result, the first Russian oratorios and songs (best done, perhaps, by the above-mentioned pre-nationalist, Titov) and the so-called cantatas of Verstovsky, another of Glinka's contemporaries, who, together with the energetic Cavos, may be said to have tilled the soil of Russian opera into which Glinka was to plant the sturdy seeds of nationalism a little later.

Although the development of Russian music in the 19th and 20th centuries has been continuous, it cannot be said to have been homogeneous. At least three distinct general tendencies are discernible in this period: (1) *the nationalist,* (2) the *Western* and what may be called (3) the *cosmopolitan* or *eclectic.* We shall consider each separately and in the order given, concluding with a summary view of (4) *recent tendencies.*

The Nationalist School.— The father of this great school of Russian music was Mikhail Ivanovitch Glinka (1804–57), who did for Russian music what Pushkin (q.v.) did for Russian literature, or Ivanov for Russian art. Although Glinka began composing in the German-Italian vein, he soon set his heart resolutely against foreign models and, by dint of genius, created music as characteristically Russian as has ever been done since. His two songs composed abroad in 1832 already disclosed Glinka's groping for a new musical style, and his epoch-making opera, 'A Life for the Tsar' (1836), gave further intimations of the birth of an independent national school of music in Russia. This opera, while still markedly Italian, has sufficient Russian color — it uses Russian folktunes and is based on a Russian plot — to win for it considerable distinction as the forerunner of real national Russian opera, which began most auspiciously with Glinka's 'Ruslan and Ludmila' (1842), his masterpiece, which at once raised the status of Russian music as the equal of any in the world. This great national

opera, attested to Russia's emancipation from foreign musical domination. An impressionable musical genius, Glinka reflected not only the influence of Russian folksongs, but also that of Oriental and Spanish folktunes. In both latter fields he has wrought his *chef-d'œuvre*, introducing new elements everywhere and breathing new life into everything he utilized. Sympathetic comprehension of the spirit of Oriental music, which is so characteristic of many Russian composers, found in Glinka the first and greatest embodiment.

But Glinka was chiefly an instrumental composer. Much as he did in this field — and he actually created the modern Russian orchestra and introduced entirely new methods of orchestration — Glinka did not do much for vocal music. With this phase of musical development Alexander Dargomyzhsky (1813–69), Glinka's illustrious contemporary, concerned himself. Although Dargomyzhsky, too, began by imitating foreign musical models, he soon surpassed all these, and even Glinka himself, in the operatic field. Even his early opera, 'Russalka' (the Mermaid, first produced in 1856), surpassed Glinka's 'A Life for the Tsar' in some respects. But his later works, the uncompleted opera 'Rogdana,' and especially 'The Stone Guest' (first produced in 1872), fully revealed the great genius of this composer. 'The Stone Guest,' Dargomyzhsky's operatic masterpiece, shows all the distinctive merits of his originality. Although but a second rate instrumentalist, Dargomyzhsky made a lasting impression on Russian music. He not only perfected the melodic recitative introduced by Glinka, rendering it colorful and expressive alike of joy and sorrow, but added a lively sense of humor entirely wanting in the works of the former. With as strong an Oriental setting as Glinka's and an even stronger nationalist element, Dargomyzhsky's works really placed the keystone in the great arch of Russian music which was begun by Glinka. While he lacked Glinka's melodic inspiration and strong lyrical vein, no other Russian composer save Musorgsky (to be considered presently) made music express life so veraciously and so passionately. Dargomyzhsky was a great realist. His constant watchword was *to fit the music to the word* — each period or sentence with the musical phrase best adapted to it — and in this respect, too, he succeeded far beyond Glinka and all his early foreign masters. In perfectly blending vocal and orchestral elements so as to form a natural and inseparable whole, Dargomyzhsky took a great step in advance even of Wagner himself.

So inspiring were the great works of Glinka and Dargomyzhsky, that a whole school of Russian composers soon grew up which strove consciously to imitate and interpret them. By continued and close study of Glinka's and Dargomyzhsky's masterpieces, this group of composers — variously known as "the Balakirev Circle," "the Mighty Set," "the Invincible Band," and "the Great Five" — mastered every essential principle embodied in them and clearly formulated such others as may have lain entirely unconscious in the minds of their adapted masters. All these principles, judiciously compounded with those of West European composers, constituted the musical tenets of the Young Russian School, the true national school of Russian composers. The leading representatives and guiding spirits of this great school were Balakirev (1837–1910), Borodin (1843–87), Musorgsky (1839–81), Rimsky-Korsakov (1844–1908) and César Cui (1835–1918). Space forbids any consideration of the musical principles which guided the work of this illustrious circle of Nationalists. As their chief mission was the radical reform of opera along the lines marked out by Glinka and Dargomyzhsky (in the field of symphonic music they accepted the work of its great Western masters), one cardinal principle may be stated to indicate their general trend. In the words of Cui himself, this was the principle that "operatic music should always have sufficient intrinsic value as absolute music, apart from the text to which it is written." "Truth and Nationalism" was their persistent battle-cry.

Of the principles and methods of this school, Balakirev was the most influential teacher, Cui the most aggressive exponent, and Musorgsky the best illustrator. The first two wrote little music, thus making the other three members of the group the most prominent composers of their school. But even though Balakirev and Cui do not rank high as composers — and the compositions of the first, especially the wonderful symphonic poem 'Tamara,' are by no means negligible — they occupy a very important place in the history of Russian music — the former as the initiator and leading spirit of the great musical school we are here considering, and the latter as the most vigorous and devoted literary champion of the principles for which it stood. Of the three others, Musorgsky was chiefly a vocal composer, Borodin an instrumentalist, while Rimsky-Korsakov worked prolifically in both fields. As they have all won universal renown, a word characterizing the work of each will not be amiss.

Musorgsky was the direct musical descendant of Dargomyzhsky, whose theories and principles he followed so faithfully that he soon excelled the work of his great master. Accepting Dargomyzhsky's musical creed concerning the realistic representation of life, Musorgsky embraced also the principle that art is a means to an end, and not an end in itself. The end, in the case of music, as in the case of the other arts, is the communication of thought. This was Musorgsky's guiding principle, which he successfully embodied in both song and opera, neither of which have ever been surpassed. His operas (especially 'Khovanstchina' and 'Boris Godunov,' both historical music-dramas) are as truly Russian in every respect as art could make them. By all means the most gifted and original composer of the nationalist school, Musorgsky has extended the bounds of musical art quite as much as did Berlioz or Wagner. Certainly no Russian composer, before or since, has done so much for musical realism. His works are not only realistic and intensely national in plot, inspiration and melodic texture, but are also veritable studies in folk-psychology, thus giving the spirit of the times as faultlessly as any historical novel. Hence Musorgsky's operas and songs, in both of which he displays truly Shakespearean insight into human nature, are human documents in the broadest and best sense of the word. Add to all this a pervading sense of musical humor — a very uncommon quality among Russian composers — and great dramatic gifts, and Musorgsky's greatness and historical importance become obvious even to the casual student of musical history.

A far lesser genius was Borodin. Just as Musorgsky continued the line of musical evolution begun by Dargomyzhsky, the vocalist, so Borodin worked along the lines laid down by Glinka, the instrumentalist. Borodin, unlike Musorgsky and Dargomyzhsky, devoted much time to absolute music, and sedulously cultivated the older musical forms discarded by the latter. In his only opera, 'Prince Igor,' Borodin is more lyrical than Glinka and more romantic than Musorgsky. In other words, he stands somewhere between national lyricism and dramatic realism. 'Prince Igor,' however, has great melodic inventiveness, national picturesqueness, and epical charm. If Borodin's music is the most national after Glinka's, his use of Oriental melodies surpasses even his great master's. But Borodin was essentially an orchestral composer, and it is as a symphonist that he has influenced the course of Russian musical development. Yet, though a great melodist and Orientalist in color (especially in such a masterly musical picture as 'In Central Asia,' one of the mainstays of the modern concert repertoire), Borodin can hardly be ranked among the foremost Russian composers.

The orchestral development begun by Glinka and furthered by Borodin, among others, attained seeming perfection in Rimsky-Korsakov, at once the most brilliant and the most prolific composer of the Balakirev Circle. An apostle of musical beauty and a perfect master of form, this many-sided Russian composer stands supreme in the history of modern Russian music, since not even the great Tchaikovsky (to be considered in another section), equals his powers of orchestration and his epical melodic charm. Rimsky-Korsakov is, first of all, an optimist (a composer in the major key) and an objectivist. Like all the lineal musical descendants of Glinka, he uses folk-melodies of several countries, setting them off in such gorgeous color and orchestrating them with such luxuriance that one almost forgets that the resulting kaleidoscopic beauty is a work of art. Nor is it possible to say in which department, orchestral or vocal, Rimsky-Korsakov really excels. He has produced first-class symphonic music (including the universally admired suite, 'Scheherazade') and many splendid operas (including such gems as 'Sniegurotcha'), besides volumes of songs, duets, choruses and cantatas. Besides being the most versatile Russian composer and the greatest wizard of orchestration, producing endless varieties of rich orchestral color, Rimsky-Korsakov enjoys the additional distinction of being the greatest Russian musical fabulist — a great "musical archeologist," he has been aptly called — for the way he draws upon folklore and legends for his enchanting opera librettos.

Manifestly, such splendid musical development as was attained by this brilliant group of Russian composers could not continue indefinitely. A period of decadence, which almost always sets in after a particularly rich flowering out of any art, naturally followed the unprecedented musical progress made by the foremost composers of the Balakirev Circle. The numerous and inevitable followers were, for the most part, uninspired imitators. Devoid of original ideas, they became a cult of mere formalists — musical rhetoricians, as it were. Thus, the representatives of the second generation of nationalist Russian composers, Glazunov (1865–) and Liadov (1855–1914), both distinguished pupils of Rimsky-Korsakov, were very skilful technicians whose musical inspiration hardly ever keeps up with their mastery of form. Of the two, Glazunov is the greater technician; Liadov, the greater melodist. Both have their followers and imitators in Russian music. Mention might be made of Shtcherbatchev, Sokolov, Ladyzhsky, the two Blumenfelds, Alferaky and others, who should be classed in the school best represented by Liadov. Among the followers of Glazunov, most prominent are Vitol, Liapunov, Gretchaninov, Kapylov, Antinov and Yestafyev. But, of course, none of these groups of younger nationalists suggest even remotely the great older generation of Russian composers in whom the great nationalist school of Russian music reached its culmination. Whether the vein of nationalism has finally run dry, or whether other tendencies have ultimately replaced it, cannot be discussed in the present article. Certain it is that the glorious illumination we have been considering in this section has not yet found its like in Russian musical history.

The Western School.— Even while the nationalist illumination was at its height, the "New-Russian School" did not have the field all to itself. Not only then, but from its very inception, this school or tendency had a formidable rival in the Western school, represented by the two Rubinsteins, Serov and others. Indeed, the Western tendency antedated the nationalist, being the more natural heir of the 18th century foreign-opera period. The struggle between the two great schools constitutes a most interesting chapter in the history of Russian music. The traditions established by the leaders of each musical camp have not entirely died out yet, though naturally the bitterness of earlier days has disappeared. There are many Russian contemporary composers who, consciously or unconsciously, represent one or the other of these tendencies; and there are some, as we shall see presently, whose eclecticism embraces both. It is impossible to enter here into the details and merits of this historic musical controversy, which raged all through the second half of the 19th century. Having already referred to the leading representatives of the nationalists, the "Mighty Five," we must now consider, however briefly, the guiding spirits of the Western school, since Russian musical history is as inseparably connected with Serov and Rubinstein as it is with the famous Balakirev Circle.

Anton Rubinstein (1829–94), who was conservative as a composer, rendered his greatest service to Russia's musical development as an educator. In a country where systematic musical education had been hitherto entirely unknown and where musical art was cultivated but by the few, Rubenstein's persistent and indefatigable educational efforts were sorely needed, if not always appreciated. It was to him that Russia owed the establishment of its first symphony concerts, the first Russian con-

servatory of music, the Imperial Conservatory of Saint Petersburg, founded in 1862, and the oldest Russian musical society, the Imperial Russian Musical Society, organized in 1859, perhaps the greatest musical organization in the world. In the teeth of much adverse criticism Rubinstein introduced into his conservatory the principle of sound musical scholarship and broad Western musical education. His insistence on this principle alone would have embittered the members of the new national school, most of whom were neither academic musicians nor professional composers. But, of course, Rubinstein's musical tastes and predilections gave them equal offense.

Just as he looked to the West for educational guidance, so Rubinstein turned thither for musical models and inspiration. Being a classicist both by temperament and by education, he followed almost religiously the musical traditions of the school of Beethoven and Mendelssohn, eschewing and detesting all musical innovations, Wagner's no less than those of the new Russian school. Lacking in originality, however, Rubinstein remained a mere imitator as a composer; and he may not improperly be classed with one or other of the German schools of the 19th century. A truly Russian composer Rubinstein never became, though he at times used national themes and set to music several Russian texts — missing, in both instances, the essential spirit of the national elements he employed. Moreover, he was a very careless composer, and most of his works lack finish and depth. He was a very prolific composer, however, and produced many works in every musical form. Though passages of exquisite beauty and even grandeur may be found everywhere, Rubinstein's longer compositions suffer for want of sustained inspiration, artistic finish and proper proportion, profuseness being one of his besetting sins. Much as he did for Russia's musical development as an educator — and Rubinstein not only taught in his conservatory, but also toured Russia as musical conductor and piano virtuoso, giving concerts and recitals of inestimable educational value — Rubinstein did very little for Russian music as a composer. Mistaking mere ethnography for nationalism, he could never become a truly national composer.

Among the composers whom Anton Rubinstein may be said to have influenced, the most prominent were his brother, Nikolai Rubinstein (1835–81), also a great musical educator and pianist; Edward Napravnik (1839–1916), a great operatic conductor, and Karl Davidov (1839–89), perhaps the greatest violoncellist Russia has ever produced.

More important also as a musical educator than as a composer was the other prominent opponent of the Balakirev Circle, Alexander Serov (1820–71), the first well-educated professional music critic in Russia. Beginning with a series of essays and lectures interpreting the meaning of Western composers — Mozart, Beethoven, Donizetti, Rossini, Meyerbeer, etc.— and ending with his whole-hearted praise of the works of Richard Wagner, Serov did very much to spread musical knowledge in Russia. His influence on the reading public of his day was inestimable. By raising musical appreciation in Russia he did for Russian music pretty much what the great Belinsky (q.v.) did for Russian literature. For having lifted Russian musical criticism to its professional level, a level well sustained by at least two other musical critics (Laroche and Ivanov), Serov's name deserves always to be remembered in the history of Russian music. But, being a subjective critic and by no means a very consistent one, his four collected volumes of musical criticism abound in misleading and contradictory statements, many of them made in the heat of journalistic debate, for Serov was a born and bitter controversialist.

The Cosmopolitan or Eclectic School.— Neither the strictly nationalist nor the purely Western tendency in Russian music proved self-sufficient. Rubinstein has had no noteworthy followers, while the nationalist illumination owed most of its brilliancy to such rare geniuses as Musorgsky and Rimsky-Korsakov. Whatever truth there was in the two diverse views, neither of them contained the whole truth. The golden mean in this case was found by the great Tchaikovsky, the greatest Russian composer and the foremost representative of "occidentalism" or "eclecticism" in Russian music.

Peter Ilyitch Tchaikovsky (1840–93), a pupil of Rubinstein, did not actually belong to the Balakirev Circle, though some of his works embody principles formulated by the famous "Five." He cannot properly be classed with the new Russian school, since he persistently deviates from the straight and narrow path of pure nationalism. Though Tchaikovsky undoubtedly had much in common with the Russian nationalists, his artistic tastes and leanings were too Western to be confined within the narrow bounds prescribed by nationalism. Thus it came about that in Tchaikovsky these two musical tendencies were happily combined.

Like his great contemporary, Rimsky-Korsakov, Tchaikovsky was a very prolific composer, having created numerous works in every field of musical composition — orchestral, operatic, song, chamber music, concertos, etc. It is as an orchestral composer, however, that Tchaikovsky's genius shows to greatest advantage; and it is as a symphonist that he ranks among the greatest composers of the world. Tchaikovsky's characteristic vein is subjective — introspective. All his symphonies but one are written in a minor key, while the three greatest are pervaded by a tone of intense struggle and revolt. If Rimsky-Korsakov may be described as a musical optimist and an objectivist, Borodin as an epical composer, and Musorgsky as a delightful realist, then Tchaikovsky may be characterized as a musical pessimist and subjectivist. The lyrical vein of Glinka, whose musical heritage he, naturally, shared, finds its highest expression in Tchaikovsky. The spirit of folksong, which pervades the best melodies of Rimsky-Korsakov, yields in Tchaikovsky's typical music to sombre themes steeped in introspection. Technically and temperamentally he is an uneven composer, resembling in this respect the less gifted Rubinstein. While Tchaikovsky's rhythms are often capricious, his melodious vein seldom runs dry, and his rare elegaic charm remains forever fresh, while as a master of orchestration he is second only to Rimsky-Korsakov.

Just as the nationalist school of modern Russian composers reached its highest development in Rimsky-Korsakov, its most brilliant representative, so the cosmopolitan or eclectic school attained its greatest glory in Tchaikovsky, its most illustrous composer. In neither case have followers or disciples sustained the splendid attainments of their great masters. The followers of Tchaikovsky are quite numerous. They include Arensky (1861–1906), a fairly interesting melodist and a skilful harmonizer; Kalinnikov (1866–1900), a very promising symphonist who died all too soon; Ippolitov-Ivanov (1859—), a great connoisseur of Caucasian and Semitic melodies; Taniev (1856—), a composer best known for his chamber music, and Rakhmaninov (1873—), the greatest and most promising follower of Tchaikovsky, if not the foremost living Russian pianist and composer.

Recent Tendencies.— Many and varied are the new tendencies that have appeared in Russian music since the days of Tchaikovsky and Rimsky-Korsakov. As these practically coincide with the beginning of the present century, they are all too new to have reached any very definite development. It is, therefore, as impossible to label such tendencies as it is to classify the contemporary Russian composers into "schools." The necessary historical perspective is altogether wanting for such a task. All that can safely be attempted in this article is a very general outline of such few tendencies as seem most pronounced and unmistakable at this writing.

It seems to have been inevitable that the world-wide radical tendencies — "impressionism," "futurism," and what not — prevalent in music, as in art generally, since the close of the 19th century, should have found their way into Russia. At any rate, we have in recent Russian music unmistakable echoes of Debussy, Ravel, and Dukas, in France, and of Reger, Richard Straus, and Schönberg, in Germany. The three chief representatives of these new tendencies in Russia are Skriabin (1872–1915), Stravinsky (1882—) and Prokofiev (1891—). Of course these three names do not exhaust the list for Russia any more than the preceding ones exhaust those of France and Germany; but a brief characterization of the work of these more eminent ultra-modern Russian composers will indicate the general direction their numerous imitators are taking.

Skriabin, whose earlier compositions are delightfully Chopinesque, passed through a period of Liszt-Wagnerism before becoming the musical extremist for which he is known the world over. Thus it is in his last period that Skriabin showed his unmistakable impressionism. Becoming more and more independent as a composer, he introduced more and more revolutionary ideas into his works. For instance, in his symphonic poem, 'Prometheus,' the composer tries to prove the fancied relationship between sound and color by introducing what is known as "the color-keyboard." This experimental fusion of auditory and other sense-impression was to be carried still further in a symphonic poem which would utilize perfume as well as color, but Skriabin's premature death prevented its completion. There is no telling what course this original composer would have taken next, had he lived longer.

Less of a musical theorist and more of an impressionist than Skriabin is Stravinsky, whose great originality asserted itself from the very first ('Scherzo Symphonique'). More than any other Russian composer, Stravinsky resembles Debussy and Schönberg. Proceeding to assert himself in subsequent compositions, he soon came to be generally regarded as the foremost "Futurist," which meant that Stravinsky had gone somewhat beyond legitimate impressionism.

Harder to classify than either Skriabin or Stravinsky is Prokofiev, the youngest of the three and seemingly the most immature. Decidedly under the influence of Schumann and Brahms, he yet shows unmistakable traces of Reger. Though having little in common with Stravinsky's general musical manner, he yet reveals internal traits strongly suggestive of his futurism. Prokofiev, evidently, has not yet found himself.

The only one of these composers whose followers can be said to have formed a new school is Skriabin. In both Petrograd and Moscow there are innumerable budding composers who try to ape Skriabin's compositions, a task far beyond mediocrity. Of these imitators — and to some extent of all the impressionists and futurists — it may be said that their principal shortcomings are the lack of thematic invention and solid musical scholarship. Disregarding fundamentals and seizing upon accidentals, these ultra-moderns worship musical form above spirit and substance, seeking dissonance instead of consonance. The great advance made in modern orchestral technique enables these composers to hide a woeful paucity of musical ideas under much belabored orchestration. The result, in most cases, is much ado about nothing.

Bibliography.— Considering the very important place Russian music now occupies in the concert halls and opera-houses of at least two continents, it is more than surprising that there should be such a scarcity of literature on the subject in West European languages. In English this dearth is particularly disconcerting. Apart from periodical literature, which cannot be listed here, five more or less comprehensive works (two by the same author and two in translation) are practically all that is available in English at this writing on the subject of Russian music generally: Cui, César, 'A Historical Sketch of Music in Russia' (in Century Library of Music, Vol. VII, New York 1901); Montagu-Nathan M., 'A History of Russian Music' and 'Contemporary Russian Composers' (both London 1914 and 1917, respectively); Newmarch, R., 'The Russian Opera' (New York 1914); and Pougin, A., 'A Short History of Russian Music' (ib. 1915). In French the list of such works is just as short. Besides Pougin's history, already mentioned in its English translation, the reader of French will find the following variously interesting: Bruneau, A., 'Musiques de Russie et Musiciens de France' (Paris 1903); Marliave, J., 'Musiciens Russes' (In 'Études Musicales,' ib. 1917); and Soubies, A., 'Histoire de la Musique en Russie' and 'Précis de l'Histoire de la Musique Russe' (both Paris 1898 and 1893, respectively).

The most critical and comprehensive Russian work on the subject is Berîzovsky's (Saint Petersburg 1898). There are, besides, a very admirable series of essays by Engel (Moscow

1911), a good historical sketch by Kashkin (ib. 1908), and that most authoritative if not unbiased sketch by César Cui mentioned above, which is available in French as well as in English.

Of course, there is no end of literature treating of various phases of the subject. But limitations of space preclude all special and classified bibliographies, which may be found elsewhere in this and other reference works.

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9. EDUCATION IN RUSSIA. Educationally, as in other respects, Russia has long lagged behind the more progressive countries of both Europe and America. Neither in their extensity nor in their diversity can the schools of Russia compare favorably with those of Germany, England or the United States.

History.— Russia had no schools worth mentioning before the end of the 14th century, when the southwestern part of the country came into contact with Western civilization. Then, for the first time, well-organized schools appeared in Russia. But these were in no sense national schools — and were not intended for the general public. It was not before Peter the Great, three centuries later, that Russian schools assumed Western characteristics. Up to his time all schools and schooling had borne a decidedly ecclesiastical character and depended wholly upon the clergy; but during this monarch's reign Russian education was secularized, extended and rendered more practical. Under subsequent monarchs there were various periods of bitter struggle between educational autonomy and state autocracy, induced by the shifting political aspects of the times, until the Great War and the proclamation of the Russian Federated Republic inaugurated a new educational era.

The Minister of Education appointed by the provisional Kerensky government, Ignatiev, was a progressive educator, who planned many educational reforms for Russian schools — including the elective system, the professional training of teachers, etc. But these and other important educational projects were halted by the Civil War into which Russia was plunged by the Bolshevist coup d'état of 1917, and naturally await the settled conditions of peace for development.

Organization, Etc.— For educational purposes monarchial Russia was divided into 15 districts, with the Ministry of Public Instruction as the supreme central authority. The Holy Synod exercised considerable control over primary schools, while the ministries of War, Marine and Finance maintained their own educational departments for the management of military schools, naval academies and commercial institutes. Save in the Lutheran parishes of the Baltic provinces, education in Russia was neither universal nor compulsory. Although under the Primary School Law of 1864 children of every rank, race and creed were to be admitted to primary schools controlled by the state, not more than one-sixth of the children of school age could be accommodated in Russia for lack of school facilities. Hence the low average literacy — about 21 per cent through the former empire. The course of study was extended in 1872 to three years for ordinary and six years for urban primary schools, the latter including history, geography, geometry, the elements of physics, science and singing, besides the inevitable three R's and such special subjects as were approved by the Minister of Education. The actual support of primary schools devolved upon the central government, local authorities and private societies, as the case might be. Certain Sunday schools, supported by private funds, also carried on regular primary work with the approval of the Minister of Education. There were besides, many denominational schools engaged in secular teaching throughout the country which were similarly authorized. Before the World War there were, all told, about 126,000 primary schools in Russia, with a total enrolment exceeding 8,264,000 pupils.

The principal schools of secondary grade in Russia before the Revolution were *Gymnasia* (classical high schools), *Realschools* (modern high schools), *Progymnasia* (junior high schools) and commercial schools. The first were intended to lead directly into the universities, while the second prepared pupils for the various technical schools. As many gymnasia students never entered the university, a new kind of secondary school — something between the classical and the modern high school — was under consideration when the war broke out. Besides these types of secondary schools there were many others — teachers' institutes, teachers' seminaries, girls' high schools ("female gymnasia"), etc. A special kind of girls' secondary school, a sort of boarding school similar to Roman Catholic convent schools, was established by Empress Maria, wife of Alexander II, which ultimately necessitated a separate educational department assuming almost ministerial rank. This particular institution is believed to have been the forerunner of numerous girls' high schools in Russia and thus promoted the education of women to no inconsiderable extent. The regular high-school course runs from seven to eight years, and in the case of girls includes no classical languages. As in the case of primary schools, many high schools are maintained by private organizations, but all are controlled or supervised by the government. The total number of secondary schools in Russia increased from 760 in 1909 to 2,050 in 1914 and the number of enrolments from 171,687 to about 685,601.

Russian universities resemble those of other countries in many respects. In imperial times they had the usual faculties of law, philology, science, medicine, chemistry, etc., but foreigners were denied admission to all but musical conservatories. Private universities were the exception rather than the rule. The social spirit characteristic of the best European and American universities has in the past been wanting in Russian universities, being replaced by intense political activity — hence the government's repressive measures referred to earlier in this article. The number of applicants for admission always greatly exceeding all possible enrolments, a stiff competitive examination precedes matriculation in Russian universities. As many university graduates land in the civil service, there was always a close connection between the proverbial incompetence of government officials and the unfortunate educational situation just referred to, which often makes the choice of one's profession largely a matter of chance. The leading Russian universities before the Revolution were those of Moscow, Petrograd, Kiev, Kharkov, Kazan, Warsaw, Odessa, Yaroslav, Tomsk and Saratov. These had a total of 39,027 students in 1914. During the Great War a women's university was founded at Petrograd and a new university was decreed at Perm.

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Specialist in Russian Subjects.

10. RUSSIAN RELIGION. Pagan Period.— The Russian national chroniclers have left us scanty details as to the primitive religious beliefs of the Russian tribes. Russian paganism, despite the multiplicity of its idols, rests on a monotheistic conception of the divinity. Svagor (in Sanskrit, the God coming from Heaven) is the JHWAH, the Jehovah, Jove or Jupiter of the Russian Olympus, the god of the lightning. All the other gods were born from him. The most powerful of them are the Sun and the Fire. An important divinity is Peroun, adored as the giver of rain. Stribog represents the classic Æolus. Other divinities are Siwa, the god of peace and concord among men; Tur, the god of war; Rod and the Rozhantzy, the domestic lares; Mara, the goddess of pestilence; and the Rousalki, the Russian lake and marsh nymphs.

Russia gave her divinities human form; and the national chroniclers mention the statues of Peroun, Dazhbog, Stribog, Simargl and Komosh. Temples do not appear to have been built. Their places of worship were the summits of hills, woods, the springs and occasionally rustic cabins and barns. They offered their idols sacrifices of slaughtered and burnt animals, and of bread and fruits. On supreme occasions, human sacrifices were offered to appease the wrath of the gods. The sacrifices were made not by priests, but by the princes, the chiefs of the tribes, the seniors and even by the chiefs of the families. The Pagan Russians believed to some extent in the immortality of the soul, and a life hereafter. According to their belief, souls after death were gathered in the island of Buyan, in the middle of the ocean; coming from time to time to visit their native country. The early Russians practised cremation, burning the dead in small canoes. A year after death, the souls were commemorated with funeral banquets, and other ceremonies. It seems also that the faith of Russian paganism in the immortality of the soul had an element of metempsychosis.

The religious calendar was based upon the change of seasons. The beginning of the new year was celebrated with special ceremonies in honor of Peroun and the Sun. They were called Koliady, a name derived from Latin *Kalendæ* or according to Solovev, from *kolo* (circle, the symbol of the sun), and Lada, the goddess of spring. It was replaced later by Christmas. The same divinities were honored in great celebrations at the beginnings of spring and summer. The last one was transformed in Christian Russia into the feast of Saint John the Baptist. The festival in honor of Volos, (Skandinavian Valas), the patron god of cattle, became the day of Saint George.

Russian paganism did not vanish when the Christian gospel began to be preached. It survived in the popular language, sayings, traditions, domestic life and even religious beliefs. As late as the 18th century, serpents were adored in some remote villages. Eugenius Golubinsky, the greatest historian of the Russian Church, declares that Russia was baptized in the 9th century, but not christianized.

Russian Christianity.— The history of Russian Christianity may be divided into four distinct periods: (1) The period of the metropolitans; (2) the Patriarchal period; (3) the Synodal period; (4) the Revolutionary period.

1. *Russian Metropolitans.*— The official history of Russian Christianity begins with the baptism of Vladimir Sviatoslavich in 987. This does not mean that Christian faith was ignored in Russia before that time. The national chronicles attribute the earliest propagation of the Gospel in Russia to the Apostle Saint Andrew, who after having established an episcopal see at Byzantium went to Korsun, in the province of Tauris, reached Kiev and Novgorod, preached to the Vareghs and lastly set out to Rome. The thesis, however, of the apostolicity of the Russian Church is of later origin, according to Golubinsky, and cannot be demonstrated as historically true.

The frequent relations with Byzantium and the existence of a Slavic colony in Constantinople explain, however, why a nucleus of baptized Russians is remembered as observing Christianity in the city of Kiev, at a time when Paganism dominated all Russia.

Photius, patriarch of Constantinople, affirms in his encyclical letter to the Eastern hierarchy that he sent a bishop to the Russians to convert them to Christ. At the time of Igor Riurikovich (913–945) a Christian church existed in Kiev, and after the death of this prince, his wife, Olga, according to Konstantin Porphyrogenetus, went to Constantinople, and received baptism there, probably in 954. She was, says Nestor, the first Russian woman who entered the kingdom of Heaven.

In 986, the Russian chroniclers tell us, Vladimir received the visits of the representatives of various religions; including the Mohammedans, Jews, Catholics and Orthodox Greeks. The Greek form of Christianity was his choice for a religion. He was baptized in the Greek town of Korsun, and here also he married the sister of Basil, emperor of Byzantium, Princess Anna. He became the apostle of his own people. He went back to Kiev with some Greek priests and ordered all the inhabitants to be baptized. The idol of Peroun was thrown into the Dniepr. Violence at times was employed in order to conquer Russians for Christianity. The pagans of Novgorod refused to receive baptism and had to be compelled to do so. During his whole reign Vladimir strove earnestly to spread Christianity, to build churches and to organize his kingdom on a Christian groundwork. His efforts, however, did not succeed in grafting Christianity on the Russian soul. For lack of religious instruction, the Russians persevered in the practice of paganism. The responsibility for this state of things rests upon the Byzantine hierarchy whose leaders were called to rule the new Russian Church.

The earliest period of the history of the Russian Church is a mere episode in the history of the Byzantine hierarchy. Russia was considered as a metropolitan church in the

ecclesiastical system of Byzantium. Its first metropolitan, Leon, was sent to Vladimir in 991 by the Greek Patriarch Nikolaos Chrysoberghes (983–996). During two centuries and a half (991–1237) the Russian Church had 24 metropolitans elected and consecrated by the patriarchs of Constantinople. Most of them were Greek. They naturally considered everything from the Greek point of view, wrote polemical works against the Latins and sought to keep Russian Christianity far from the influence of the Roman Church. They thwarted any attempt to expand the influence of Latin Christianity within the Russian frontiers. The 11th century marks a period of strong vitality in the bosom of the Russian Church. It is the earliest transplantation of Greek monasticism in Russia. Kiev became the cradle of Russian monks, who with Antonius and Theodosius Pechersky (who died in 1073 and 1074, respectively) and the monk Nestor, began to give a markedly national character to the Russian Church. Russian bishops strove to loosen their bond with the Greek patriarchate. Together with these attempts to establish in Russia an autonomous church, the foundation and organization of Russian eparchies went on especially in the 13th century. Their number under Vladimir was eight; after his death, and down to the Mongol invasion, they increased to 16.

The development of Russian Christianity was hampered and almost stopped by the Mongol domination, which destroyed Kiev in 1240. For two centuries, Russia was entirely cut off from any contact with Western Christianity. The Mongol Khans did not systematically persecute the Christians. They even granted large privileges to churches and monasteries. The Russian metropolitans were held in great honor at their court and were able to use their influence to ameliorate the hard lot of their flocks. But in consequence of the Mongol yoke, the moral and religious conditions of the Russian people sank very low.

In 1303 there took place the first attempt to divide the hierarchical unity of the Russian Church. An independent metropolis of Galicia was established. In 1316 Lithuania claimed its religious autonomy. These new fragments succeeded in severing themselves from the metropolitans of Moscow whose authority over the Russian Church was otherwise steadily growing, as a logical consequence of the growth of the political power of the grand princes of Moscow. The Russian Church participated in the Council of Florence in 1438. The metropolitan of Moscow, Isidor (1436–41), signed the decree of union of the Russian Church with the Roman Church, and his admission was marked by the red hat. But the spirit of Byzantine Christianity was deeply rooted in both the Russian hierarchy and people; Isidor was obliged to leave Moscow, and his successors rejected the union with Rome.

In Little Russia, on the contrary, where the Western influence was stronger, the movement toward union gained ground. In 1458 Kiev became the seat of a united metropolitan, Gregorius, who, however, went back to the Orthodox Church in 1472. The tendency toward an understanding with Rome was kept alive, like a smoldering fire, and under the political and religious influence of Poland, in 1596, gave birth to the United Ruthenian Church.

2. *Russian Patriarchate.*— The second period of the Russian Christianity embraces the short-lived patriarchate of Moscow. It puts an end to the dependence of the Russian Church on the Greek hierarchy. The idea of the establishment of a Russian patriarchate was a natural consequence of the downfall of the Byzantine Empire and of the growth of Muscovite Russia. Moscow was hailed as the third Rome. In 1588 Ieremia, patriarch of Constantinople, went to Moscow. Tsar Teodor Ivanovich and Boris Godounov received him with great honors and asked him to grant full autonomy to the Russian Church, and the establishment of a patriarchate at Moscow. After some hesitation, Ieremia allowed himself to be won by the promises of the tsar. Iov, archbishop of Novgorod, was elected patriarch by a council of Russian and Greek bishops, held at the cathedral of the Assumption on 23 Jan. 1589. Another council held at Constantinople in May 1590, ratified, although reluctantly, the concession made by patriarch Ieremia. The new patriarchate embraced four metropolitan jurisdictions, eight archbishoprics and eight eparchies. It lasted a little more than one century, and during this period 11 patriarchs ruled the Russian Church, namely, Iov (1589–1605); Ignatius (1605–06); Hermogen (1606–12); Filaret (1619–34); Ioasaph I (1634–41); Iosif (1642–52); Nikon (1652–67); Ioasaph II (1667–72); Pitirim (1672–73); Ioakim (1674–90); Adrian (1691–1700).

The patriarchs exerted considerable influence, both religious and political. They were looked upon as grand princes. They had their court, their dignitaries and an immense income. Filaret, the chief of the dynasty of the Romanovs, was, during his patriarchate, the real tsar of Russia. Patriarch Nikon struggles with Tsar Aleksiei Mikhailovich, seeking the supremacy of the ecclesiastical upon the civil power. The issue of the struggle was fatal to him. A council held at Moscow in 1667 condemned him as a rebel to the legitimate authority of the tsars, to whom a large power was recognized in ecclesiastical matters. Peter the Great, in order to carry on his vast plan of reform in every branch of Russian life, abolished the patriarchate, entrusting the government of the Russian Church to a patriarchal vicar, Stefan Iavorsky, and charged Theofan Prokopovich, a Malorossian, a theologian of great renown and a warm admirer of German Protestantism, to draw up a schedule of reforms to be effected in the Russian Church. Theofan, who was later named metropolitan of Pskov, fulfilled the task assigned to him, and wrote the 'Spiritual Regulation,' which became for two centuries the official constitution of the Russian Church.

3. *The Synodal Period.*—The Spiritual Regulation was written in 1720. On 25 Jan. 1721 the ukase establishing an ecclesiastical board to be endowed with supreme authority over the Church was promulgated. The board under the name of the Holy Governing Synod held its first meeting in Petrograd on the 14th of February. The Holy Synod was composed of several archbishops, priests and a lay dignitary, the high procurator, who, according to the Spiritual Regulation, was to be chosen preferably from among the most energetic officers of the army.

With the foundation of the Holy Synod the Russian Church became a department of the civil bureaucracy of the Russian Empire, and its history is thenceforth a portion of the lives and policies of the Procurators. A vigorous censorship was established for all the theological writings. The foundation of new eparchies, the nomination of the bishops, the monastic life, the missions either inside or outside of Russia were topics all necessarily subject to the supervision and approval of the government. The influence of the Russian Church in the social and religious field was unceasingly checked by its bureaucratic yoke. Russian Christianity could not exert the beneficent influence rightfully its own due to it. Control of the Church was gained by the Slavophil party which tried closely to associate autocracy and orthodoxy as the joint pillars of the Russian state. This was notably true in the recent ecclesiastical dictatorship of the Procurator Konstantin Pobiedonostzev. The result of this policy was that the Church lost the intellectual classes, the so called *intelligentsiia,* and became a mere tool in the hands of the Russian bureaucracy for the support of tsarism.

4. *The Revolutionary Period.*— This period begins in 1905, as the outcome of a new spirit pervading Russia and exerting its influence over the clergy. A group of liberal priests of Petrograd issued a proclamation of freedom for the Church. This movement was frowned upon by the high clergy, but met with an unconditional support from the lower clergy. In order to answer the demand, the Holy Synod proposed the convocation of a General Synod of the Russian Church. The bishops were invited to outline their plans of reform. A special commission was charged with a preliminary discussion of the radical changes to be introduced into the constitution and inner life of the Russian Church. At the end of 1907, however, the forces of reaction had regained the ascendency and the project of the general council sank into oblivion.

The downfall of the autocratic régime in Russia left the Russian Church the power of determining her own affairs. With a few exceptions in the ranks of the hierarchy, the clergy accepted joyfully the establishment of democracy. Some even advocated the complete democratization of the Church and the abolition of the hierarchy. But the extremists were unable to awaken in Russia the spirit of a radical reform like that of Luther in Western Christianity. The best elements of the Church met in the General Council of Moscow, held in September–October 1917. Bishops, priests, monks and laymen discussed the conditions of Russian Christianity and came to the conclusion that after the disappearance of Russian autocracy the Russian Church needed a visible religious head, the centre of the religious forces of the crumbling empire. The restoration of Russian patriarchate was approved by an overwhelming majority of votes. Tychon, metropolitan of Moscow, a liberal bishop who lived many years in the United States, was elected patriarch. He assumed at once an energetic attitude against the spreading wave of bolshevism and became the embodiment of the conservative forces in Russia and of sound Russian nationalism. The Russian Church is recovering her prestige and fitting herself for the social and political changes brought about by the democratization of Russia.

Statistics.— Before the European War Russian Christianity, or according to the official expression, the Russian Orthodox Church, numbered 87,000,000 of the faithful and there were over 70,000 churches and chapels. From an administrative point of view, autocratic Russia was divided into metropolitan districts, eparchies (dioceses), vicariats, deaneries and parishes. The Russian clergy, charged with the spiritual care of the orthodox population, formed two entirely distinct castes: the «white clergy» (secular priests) and the «black clergy» (monasticism). All the higher clergy (metropolitans, bishops and vicar-bishops) in accordance with an old tradition, have been chosen from monastic ranks.

The Russian hierarchy enhanced their authority and organization under the synodal régime. At the time of Peter the Great, the Russian Church numbered only 18 eparchies and two vicariats. At the dawn of the 19th century there were 36; in 1890, 62. In 1905 the Russian hierarchy consisted of three metropolitans (Petrograd, Moscow and Kiev), 16 archbishops and 108 bishops (including 44 vicar bishops or coadjutors). Most of them have completed their studies in the Russian theological academies. A half, approximately, had been married priests, who, after the death of their wives, embraced monastic life. Under the old régime the metropolitans received a salary of 50,000 to 75,000 roubles. The salaries of the bishops varied between 1,500 and 20,000 roubles.

In spite of the repeated confiscation of their properties, the Russian monasteries grew in wealth and numbers during the synodal period. In old Russia, monasticism lived an exuberant life. Kiev possessed 17 monasteries and Nizhni-Novgorod 20. Peter the Great issued several ukases with a view to limit the number of monasteries and hinder entrance into them of postulants. At the beginning of the 18th century, Russian monasteries held 14,534 monks and 10,673 nuns. As a consequence of the restrictive laws of Peter the Great and Anna Ivanovna, their number was respectively reduced to 7,829 and 6,543. In 1764 many monasteries were suppressed and their properties were confiscated. From 954 at that time, they decreased to 452 in 1810. The protection of Tsars Paul I, Alexander I and Nicholas I restored their prosperity. The monks gathered immense riches. New monasteries were built everywhere in Russia. At the beginning of the 20th century there were over 500 monasteries of monks and 300 monasteries of women, the former with 15,000 monks and novices, and the latter with 38,000 nuns and novices. Among the Russian monasteries four of the most famous are decorated with the epithet of *lavra*: those of Saint Alexander Newski in Petrograd; of Saint Theodosios Pechersky in Kiev; of the Most Blessed Trinity at Serghievo, near Moscow; and of the Assumption at Pochaev. Seven other monasteries are called *stavropigiaki.* In the canon law of the Eastern churches, these attributes mean that the monasteries are subject to the immediate jurisdiction of the patriarch.

The white clergy is charged with the ad-

ministration of the parish churches. They number 2,340 archpriests, 44,487 priests, 14,960 deacons, 43,552 psalm readers. According to the most recent statistics, there are 37,465 parishes and 59,703 churches; the cathedral-churches existing to about the number of 700.

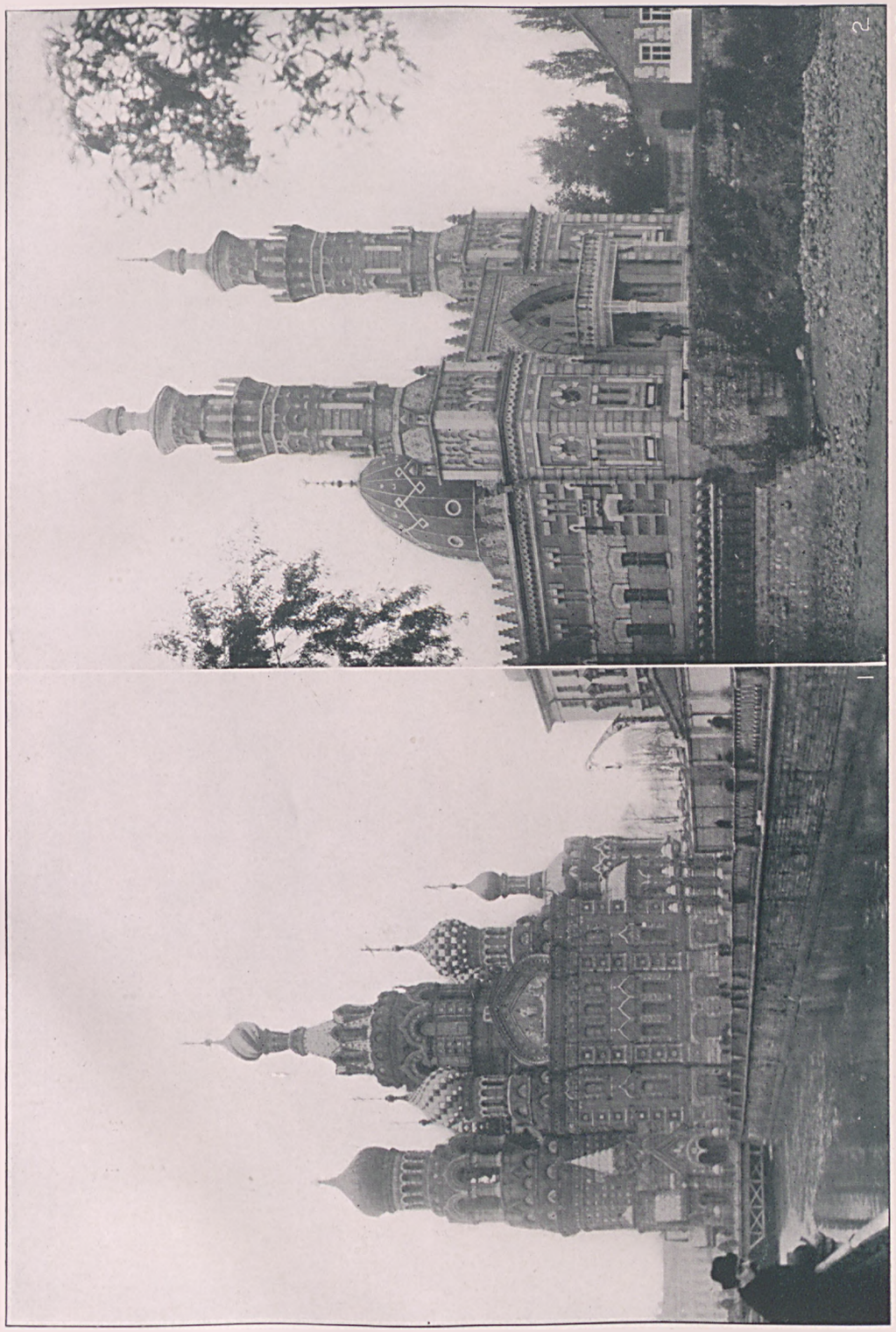
Social Conditions of Russian Christianity. —A recognized fact in the history of Russian Christianity is the slight influence exerted by the Russian clergy upon their flock. At the outset of her Christian life Russia depended for the foundation of her churches upon the generosity of the princes, or of the *mir* (commune). The choice of the priests for the services of the churches belonged to the members of the parish. The candidates who offered their services for smaller salaries were given the preference. Thus ignorant or loose priests came into possession of ecclesiastical benefices and consequently the Russian priesthood lost its moral prestige. The nobility contributed to its decay as their serfs were ordained in order to increase their revenues. Russian councils, especially that of the «Hundred Chapters» (Moscow 1551) strove to improve the moral condition of the clergy and to render more difficult entrance to holy orders. In the 16th century there were villages of 30 families, served by four priests.

The ecclesiastical reforms of Peter the Great aimed first of all at reducing the number of the clergy and putting an end to the autonomy of the parishes. In 1722 he fixed one priest as the maximum for a village of 150 families. The sons of the clergy and even psalm-readers and deacons were enrolled in the army. His policy was continued by his successors and in 1841, when the statutes of Russian consistories were promulgated, the last traces of parish autonomy disappeared.

Under the synodal régime the Russian clergy transformed themselves gradually into civil employees. They became clerks, preparing numerous documents and statistics to be used by the civil and military bureaucracy. Not infrequently were their services turned to account by the police authorities. Under a ukase of 1716, the clergy had each year to submit a list of all the members of their respective parishes who had not received holy communion. This ignoble subjection to the civil bureaucracy lost the clergy their prestige and could not but result in their enslavement to the autocratic régime. It was not unnatural, therefore, that they should share with the bureaucracy the bitter hatred of the revolutionary leaders. Famous painters like Perov, Riepin, Makovsky, Korzuklin and great novelists like Solovev, Chirigov, Glukhovtzovoi, Vasilich, and especially Leonidas Andreev, depicted in the darkest colors the degradation of the clergy. A reaction followed in 1905. The better minds in the white clergy became the leaders of a movement for the independence of the Church and her separation from the State. A schedule of liberal reforms was drawn up by 32 priests of Petrograd and inserted into the *Ecclesiastical Messenger*. For several years the struggle between the partisans of the old régime and those of the democratization of the Church went on violently. At last, with the downfall of the Tsarism, the liberal element gained the ascendency and the Russian clergy, freed from their servile submission to the State, will doubtless exert a great influence upon the spiritual rebirth of Russia.

Economic Conditions.— Extreme poverty has been the lot of the clergy from the beginning of Russian Christianity. Priests, Golubinsky tells us, were considered as workingmen, intended to perform liturgical ceremonies. They did not claim the rôle of leaders and teachers of their people. The laws either forbade or restricted the bequeathal of property to the parish churches; frequently the clergy has had its land confiscated. Before the war the revenues of the clergy were derived especially from the land allotments of the dioceses and the parish churches. The white clergy in the villages had the social rank of the peasants among whom they labored. They themselves were farmers and aimed to keep for their sons the fields which they cultivated. Other sources of income may be noted: the sale of candles and religious articles; tithes; state allowances (not in all parishes, however); and offerings made upon the administration of the sacraments. These offerings are usually pitifully small: 35 cents for marriage, 15 cents for baptism, 3 cents for funeral prayers. Quite frequently, a priest's net income from professional or conventional fees and offerings amounts to no more than $50 a year. They have been unable, consequently, properly to support their families. Their poverty is one of the common themes of the Russian novelists. It contributed to their estrangement from the upper strata of society, but it associated their lives with the sufferings and aspirations of the poor. The white clergy sympathized with the revolutionary movement, hopeful of an improvement of their economic lot. As yet their hopes have not been realized; but when normal conditions have been restored in Russia it may be expected that the Church will quickly recover its material prosperity.

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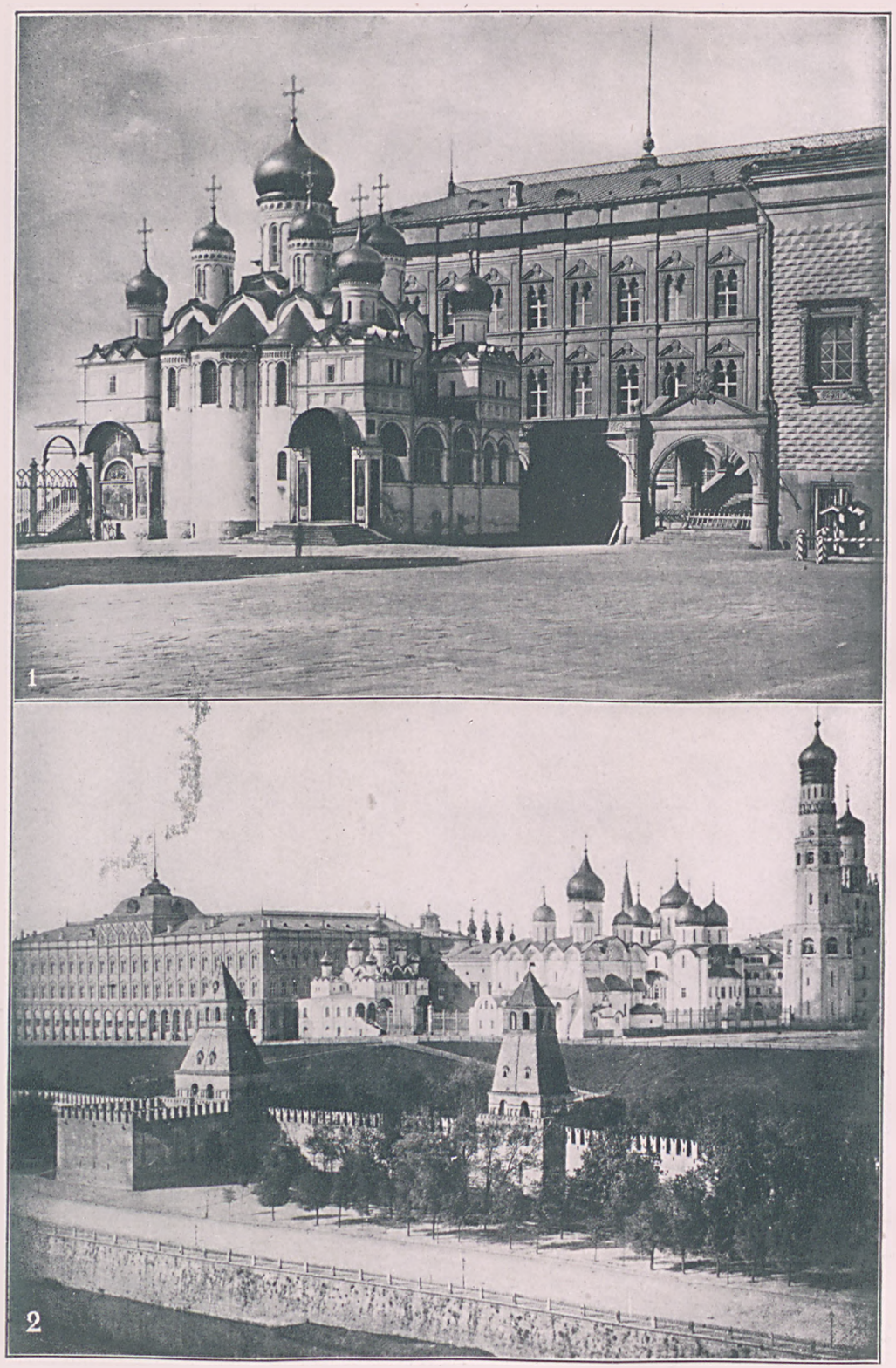


Sunnit's Mosque, Vladikavkaz, Caucasus

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Cathedral of the Resurrection of Christ, Petrograd

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1 The Cathedral of the Annunication, Moscow

2 The Kremlin, Moscow



The Petrowski Palace, Moscow



The Great Bell, Moscow

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11. GOVERNMENT AND POLITICAL PARTIES. Many and varied are the definitions given of Russia's form of government. The difficulty of properly defining or characterizing it is due, in large measure, to its changing and changeable nature — not only since the Great Revolution, but even before that event. If one were to treat the subject historically and adequately, at least five separate stages should be noted in the evolution of the Russian administrative machine. There was, first, the pre-Mongolian free tribal government, which was decidedly democratic; then came the long period of Eastern despotism introduced by Russia's Mongolian conquerors, which destroyed every element of self-government already attained; next followed another long period, ushered in by Peter the Great, during which Oriental absolutism was considerably tempered by Occidental democracy; then, again, the revolutionary demonstrations of 1905–06 brought a short period of quasi-constitutional government in which much real progress toward democratic institutions was made; and, finally, the two revolutions of 1917, the short-lived one of March and its more vigorous successor of October inaugurated many startling experiments in class government, with seemingly disastrous results upon the Russian body politic.

Limitations of space preclude any such extended treatment of this interesting subject. For present purposes, therefore, we shall adopt a simpler, if less scientific, scheme. Generally speaking, Russia was an absolute monarchy up to 1905, a limited monarchy from 1905 to 1917, a provisional democracy for some eight months thereafter and a proletarian dictatorship since the Bolshevik *coup d'état*. Considering the last two forms of government as but different phases of the transitional period, we may continue this brief study of Russia's government under three heads: (1) As it was under absolutism prior to the so-called revolution of 1905–06; (2) as it became during the quasi-constitutional period of 1905–17; and (3) as it has been in the present period of transition.

Under Absolutism (to 1905). — The government machine of imperial Russia was cumbersome, complex and very inefficient — cumbersome because too centralized, complex because insufficiently specialized, and inefficient because irresponsible. Not only did the regular administrative functions (legislative, executive, judiciary) overlap, as we shall see presently, but no consistent demarcation existed between national, state, and local government. For these and other reasons Russia's political institutions lagged centuries behind the times and were long the laughing stock of the civilized world. In imperial days, however, absolutism, with all its concomitants, was considered necessary for holding in line the numerous and diverse racial, social, and religious elements that composed the colossal Russian Empire.

The supreme authority in autocratic Russia was the *tsar* (from the Latin "Cæsar"), an absolute hereditary monarch, part of whose title was "Tsar of All the Russias." In him were vested all legislative, executive, and judicial powers, which, until the constitutional era above referred to, were exercised without let or hindrance from any legal source. There were, however, three departments of state, composed of functionaries appointed by the tsar, and one special department — the Holy Synod — which helped the monarch to administer his vast empire.

The oldest of these was the *Senate*, created by Peter the Great in 1711 and reorganized by Alexander I in 1802. Its members were all appointed by the tsar and held the rank of Privy Councillors. Being the highest judicial institution of the empire, the Senate (a) heard appeals in civil and criminal cases, (b) passed on the legality of new legislation and (c) held disciplinary court for officials from the various branches of government. For purposes of expedition, this large body of state was divided into six separate departments, two of them acting as courts of appeal, two exercising administrative jurisdiction, and the rest supervising the collection of taxes, the appointment of government officers, the preservation of the archives, etc.

Another important body concerned with imperial administration was the *Imperial Council*, which exercised only advisory legislative authority in pre-constitutional times and consisted of 196 members, half the number (including the president and the vice-president) appointed by the tsar and half elected for nine years. As its function was greatly modified by law in 1905, we shall refer to this legislative branch later.

The Council of Ministers, composed of the 12 ministers of state, appointed and removable by the tsar, was a third great organ of imperial administration. Representing all the various ministries — the ministries of Foreign Affairs, Finance, War, Navy, Justice, Education, Commerce and Industry, Ways of Communication, Internal Affairs, Agriculture, Imperial Court and Government Control — the Council of Ministers, or the Cabinet Council, was by far the most important executive institution in monarchial Russia.

For administrative purposes Russia was divided into governments (*guberni*), provinces (*oblasti*) and territories (*okrugi*). If there were such a thing as state rights in imperial Russia, the governments might be said to correspond to the American States. The resemblance is closer, however, in the case of the territorial divisions. Before the World War,

if not at the time the last tsar was deposed, Russia had 98 governments, 21 provinces and two territories. The governments, varying in size and population, were themselves divided into districts (*úyezdi*), which, in turn, were subdivided into still smaller administrative units called counties (*utchástki*). All these divisions and subdivisions run into the thousands, and were not sufficiently graded or standardized. The governments were the more central and more populated sections of the empire, most of them lying within European Russia; while the provinces, all but one of which lay in the remoter parts of the country (Siberia, Caucasia and central Asia), were inhabited by the less civilized and more nomadic elements. Every government or province had a governor (*aubernátor*) as chief administrative officer, who, in the case of the provinces, was generally also the chief military commander. The duties and powers of the Russian governor under the monarchial régime included regulations for safeguarding public order, control over all the administrative offices, supervision of all government officials and general oversight over all local government institutions, such as the *Zemstvos*, etc. In the exercise of these various functions the governor would have the assistance of a board of administration, over which he presided.

Such semblance of self-government as monarchial Russia enjoyed was represented by the *Zemstvo* (q.v.), a territorial assembly which received its official status in 1864, but which has had its powers and functions modified several times since. This elective body has had — and to some extent still has — charge of the provincial administration, which began with the village council (*Mir*), the lowest and earliest form of communal self-government in Russia and not unlike the New England town meeting; gathered authority in the canton (*Vólost*), representing a number of villages, sometimes as many as 30; and culminated in the provincial Zemstvo, a combined organization of all the district Zemstvos. Both assemblies elected a standing executive committee (*Zémskaya Uprâva*) consisting of four or five paid officials, which carried on the work of provincial government — from the construction of public roads, the prevention of cattle disease and the maintenance of primary schools, to the administration of charity, the development of trade and agriculture, the improvement of sanitary conditions and the promotion of mutual insurance and other co-operative enterprises. District Zemstvos consisted of from 60 to 65 members and met annually — oftener if necessary and the governor permitted. The latter, too, exercised the power of veto over such Zemstvos resolutions as incurred his (or his superiors') displeasure.

The Municipal Dumas were town councils presided over by a mayor (*golová*) and constituted of a few elected officials, who exercised general supervision of municipal affairs. Since 1870 these dumas copied the administrative organization and methods of the Zemstvos, but their powers were considerably reduced in 1894.

Under the Quasi-constitution (1905–17).— The tsar's manifesto of 1905 and the famous "Fundamental Laws" which followed it suddenly changed Russia's form of government theoretically and practically. The autocratic authority of the tsar became more limited through the introduction of a new representative assembly (The Imperial Duma) and the extension of the powers of an old one (The Imperial Council). The emperor still retained his former executive powers, but in the field of legislation he was henceforth to reckon with the two assemblies just mentioned, which became Russia's legislative institutions. The new principle of government thus introduced transformed Russia from an unlimited to a limited monarchy and fairly started her on her way toward representative, constitutional government.

The two legislative assemblies created in 1905–06 suggested, but did not quite resemble, the bicameral parliamentary institutions of Western countries. The Imperial Council, changed by law from an *advisory* to a legislative body, was the Upper House; the *Duma* (q.v.), the Lower. Both houses could initiate legislation, vote on the government budget and make certain recommendations and interpellations; but the Duma was debarred from exercising its authority in matters pertaining to the imperial family and the war and naval departments (including their respective courts). Moreover, the Upper House could throw out any bills or legislation passed by the Duma, while all legislation must receive the sanction of the Senate, the juridical institution retained from absolutist days, and be approved by the tsar before becoming law. Finally, while no legislation could be enacted without the Duma and the Imperial Council, yet the tsar retained — and frequently exercised — the right of issuing certain proclamations (*ukázy*) and of authorizing sundry emergency expenditures, especially in case of war, and more especially when the Duma, which he could dissolve at will, was not in session.

Apart from the legislative control left to the tsar by the so-called Constitution, he retained supreme authority in nearly all executive and judicial matters. He still had the sole power to appoint and dismiss all his ministers, to direct foreign affairs, proclaim martial law, command the military and naval forces, and to do many other things too numerous to mention. In addition to his old powers, the "Fundamental Laws" gave the tsar the right to convene, adjourn, and prorogue both houses of the newly established "Parliament," to dismiss the members elect of the Upper House, to veto any legislation passed by both houses, and to confirm or set aside verdicts of the criminal courts.

With all that, the government of imperial Russia under the charter loosely called "a constitution" was surely, if slowly, assuming democratic form. The creation of the Duma gave Russia her first experience with responsible, representative government, an experience which meant much for her political education and emancipation.

In the Period of Transition (1917–).— The Great Revolution of 1917, the revolution which dethroned the last tsar and ended monarchial rule in Russia, left the administrative government temporarily in the hands of a revolutionary committee appointed by the last Duma and presided over by its president, Rodzianko. Soon this committee, which was the sole

constitutional authority at the time, organized a coalition cabinet. The new government, which modestly called itself "provisional," was fairly representative of the leading parties composing the last Duma and the elements that hastened the Revolution. It was headed by Prince Lvov, a liberal Octobrist, elected to the premiership conjointly by the Duma and the labor elements (subsequently succeeded by the famous Kerensky), and included such other popular leaders as Paul Milyukov, Constitutional Democrat; Tereshtchenko, a many-sided liberal of truest color; and the above-mentioned Kerensky, a revolutionary Socialist representing the workmen and soldiers, who soon dominated the whole Provisional Government. Under stress of factional criticism, the coalition ministry was repeatedly reformed, becoming every time more and more representative. Five new departments were created to cope with the exigencies of war and peace — departments of Labor, Public Relief, Food Supplies, Posts and Telegraphs, and a department for the Affairs of the Constituent Assembly.

The new government at once declared itself in favor of immediate and numerous radical reforms along every line (including such matters as social, religious and racial equality, and universal suffrage). But the execution of its ambitious program, difficult enough in itself, was rendered well-nigh impossible by the ever-increasing interference with the affairs of government on the part of an emergency organization called into being during the Revolution and known as "the Council of Workmen's and Soldiers' Deputies." Such were the power and popularity of this council that its wishes — and they commonly took the form of mandates — could not well be ignored. From the very first, the provisional government had to reckon with this new influential factor in Russian politics, and such constant reckoning inevitably clogged the wheels of government machinery. Hence the Kerensky government spent most of its short career in finding its bearings and in trying to reconcile the various discordant factions, which lacked both the temper and the tradition of democratic citizenship.

But, little as the first revolutionary government actually accomplished, it gave Russia her first taste of real Democracy, which she is never likely to forget. The spirit, the machinery of administration and the reforms proposed were thoroughly democratic. Seemingly, time and administrative experience were all that was needed for the completion of the colossal task of Russian democratization, but these were denied by the Bolshevik *coup d'état* that soon followed.

Ostensibly, the Bolshevik government was placed in the hands of the Council of Workmen's, Soldiers' and Peasants' Deputies, the popular organization already alluded to but somewhat enlarged to appease the peasant element. This mixed organization, called in Russian simply the *Soviet*, has numerous branches and acts through innumerable agents styled "People's Kommissars" (a term borrowed from the French revolutionists), backed by the force of well-armed soldiers called Red Guards. All these executive officers are supposedly carrying out the will of The Central Executive Committee of the Federal *Soviets*, which is a longer name for the Bolshevik government.

The central figures and guiding spirits of the "Soviet Republic," as the Bolshevik rulers themselves style their form of government, have been and still are Nikolai Lenine, Premier, and Leon Trotzky, Minister of War and formerly Minister of Foreign Affairs. The rest of the cabinet has been changed frequently, but probably still includes Tchitcherin as "People's Commissioner" for Foreign Affairs, Lunacharsky as "People's Commissioner" for Public Instruction, and a few others fairly well known for their revolutionary sympathies.

The rule of a single class, the proletariat, is the ideal of this ultra-revolutionary government, which has been aptly characterized as a "Proletarian Dictatorship." If the first transitional government may be said to have been a "Democracy in the Making," then, surely, the second is a democracy in the unmaking.

Political Parties.— Russia had no political parties in the Western sense before the constitutional era, which is quite natural in view of the notorious want of free political discussion in that country in strictly monarchial times. Such organizations as existed in absolutist Russia were secret debating societies advocating and frequently indulging in terrorism, with revolution as their battle-cry. With the convocation of the first Duma, however — or, rather, with the promulgation of "The Fundamental Laws of 1905" granting the right of free political discussion — regular political parties became for the first time possible in Russia, and the vital factor of political struggle commenced to stir that country's otherwise sluggish life.

Historically the first political party to come into prominence in Russia was that of the "Octobrists," a conservative organization which received its name from the unbounded enthusiasm with which it hailed the famous Manifesto of 30 Oct. 1905. It was this party organized by Milyutin and Shipov, that dominated the Third Duma (1907–12).

A more liberal and more important political party was that of The Constitutional Democrats, formed, also under the influence of the manifesto above mentioned, by radical and independent elements and led by Paul Milyukov, a statesman of international fame. Its membership has included many of the most prominent leaders of Russian thought, and it was the first to frame a definite political program. This party, nicknamed from its initials (K. D.) the "Kadets" has long dominated Russian politics, being both well organized and well directed. It had its own newspaper, *Ryatch*, which was so well edited (by Milyukov) that it soon became one of the leading Russian dailies.

The most radical and aggressive political parties in Russia — and the only ones except the party of Constitutional Democrats to have survived the first Revolution — are, naturally, the various Socialist organizations. There was The Group of Toil, a Socialist labor party represented in the Duma by Alexander Kerensky himself; the Party of Democratic Reform, which was mildly socialistic; the Party of Peaceful Revolution, which believed in Parliamentary reform; the Peasants' Union which stood for the nationalization of land; and numerous other more or less radical parties.

The principal parties advocating revolu-

tionary socialism do not properly concern us here, since they are not *political* parties in the accepted sense of the term. Owing to the current prominence, however, of some of these, mention might be made of the Social Revolutionists, a Marxist organization led by Chernov; the Social Democratic party, which in 1903 branched out into the *Bolshevik* (Maximalist) and the *Menshevik* (Minimalist) wings. The bitter struggle between these two factions cannot be entered into here (see RUSSIA — HISTORY), except to say that the former, the extremist wing represented by the present ruling régime in the greater part of Russia, aspires to eliminate entirely every class but the proletariat, while the latter, the more moderate wing, seeks only to place the laborer on a political and economic level with all other classes of society. There are of course other essential differences in both principles and policies, but this single instance will serve as an illustration.

DAVID A. MODELL,
Specialist in Russian Subjects.

12. RUSSIAN INDUSTRY. Introductory.— The total national wealth of the Russian Empire, including Poland and Finland, in 1914, was estimated at about $60,000,000,000, and the total population may be estimated at about 160,000,000, the average wealth thus being about $375 per capita whereas in the United States the per capita wealth is about $2,200. The national income was estimated at $7,500,000,000 of which agriculture furnished about $4,900,000,000. These figures are a striking illustration of the low stage of Russia's economic development. Though occupying nearly one-sixth of the total land area of the earth, Russia, owing to her geographical situation, as well as to unfavorable historical conditions, has been very backward, economically and industrially.

The transportation system of a country may be taken as the best index of its industrial development. The total length of all the inland waters of Russia reaches about 200,000 miles, yet the length of all Russian canals and improved rivers totals only 1,100 miles, of which the canals represent about 550 miles. The total length of Russian railroads is 46,600 miles, i.e., 0.28 mile per 1,000 inhabitants. In the United States the respective figures are 261,000, and 2.66 miles. Tsarism had a very unfavorable influence upon the development of civilization in Russia, generally, and particularly upon its economic development. Innumerable legal restrictions prevented the development of initiative and enterprise. In Russia in 1913 the total number of joint-stock companies was less than 2,000 and their total capital stock amounted to less than $2,000,000,000. The total number of wage-earners employed in factories and mines was about 3,500,000. The total amount of horse power used in manufacturing industries of Russia in 1914 was 2,500,000, as against 22,500,000 in the United States. The total foreign capital invested in Russia before the war amounted to about $4,300,000,000. The largest investors were the French. French capital was invested in government and municipal bonds, and in coal and metallurgical enterprises in South Russia (the Donetz Basin). Next to the French came Belgian capital, invested in street railways, electric plants, coal mines and metallurgical mills. British capital was invested mostly in oil and gold mining, and played a less important rôle in the development of Russian industry than French and Belgian capital.

It must be noted, in this connection, that the government itself was the largest industrial establishment. It owned metallurgical mills, the greatest part of the railroad mileage, the greatest land area and was the largest purchaser of the products of the Russian mining and metallurgical industry. The imperialistic policy of the government determined the direction of Russian railway construction, and of the whole Russian industry.

Russia's share in the world's trade amounted in 1911–13 to 3.6 per cent. Her exports for 1909–13 averaged 1,501,400,000 roubles annually. Her imports for the same years averaged 1,136,900,000 roubles. During the last decade preceding the World War the total of Russian foreign trade was gradually increasing, but the imports were increasing faster than the exports. This was due to the fact that during the years preceding the war Russia was going through a period of intensive industrial development which caused a substantial increase in the imports of machinery.

I. Agriculture and Forestry. 1. *Agriculture.* — The part played by agriculture in Russia's economics appears from the following figures: in 1910 the total value of the agricultural products of Russia was about 9,500,000,000 roubles in gold (1 rouble in gold = 51½ cents); the total value of manufactured products, 4,900,000,000 roubles. Thus, in 1910, agriculture furnished two-thirds of Russia's total national income. According to the census of 1897, 70 per cent of the population of the Russian Empire were supported wholly or partly by agriculture.

Only about one-twentieth of Russia's territory is under cultivation. This proportion varies considerably throughout the vast area of the empire, viz.: Russia in Europe, 17.5 per cent; the Caucasus, 20.3 per cent; western Siberia, 1 per cent; eastern Siberia, 0.1 per cent; the Steppe region (of central Asia), 1.3 per cent; Turkestan, 1.9 per cent. The total area of the principal crops in 1910–12 is shown in the following table:

CROPS	Dessiatines (1 dessiatine = 2.705 acres)
Wheat, rye, and barley	67,518,000
Oats, buckwheat, peas, potatoes and lentils	28,342,000
Corn	18,742,000
Flax and hemp	20,312,000
Cotton	4,409,000

The average yield is very low, owing to lack of fertilizers. Artificial fertilizers are almost unknown in Russia. The annual yield of wheat averaged in Russia in 1907–13 10.0 bushels per acre, whereas in the United States it averaged 14.4 bushels, in Canada 19.2 bushels. Modern improved agricultural machinery is scarcely used, yet despite these handicaps Russia contributed a large share to the world's production of grains. During the years 1907–12 Russia produced 48.1 per cent of the world's supply of rye; 31.6 per cent of the total supply of barley; 24.3 per cent of the supply of oats; and 19.0 per cent of the supply of wheat. The export of grains played the most important part in Russia's foreign trade. The average annual exports for 1910–13 amounted to 11,791,800 short tons, valued at 639,900,000 roubles ($329,300,000).

2. *Forestry.*— The Russian forests cover about 3,150,000,000 acres, or nearly thrice as great an area as the combined forests of the United States and Canada. Most of these forests are in Siberia. In European Russia there are about 383,000,000 acres, of which 40.7 per cent are in the province of Archangel, 27.1 per cent in the province of Vologda, 8.5 per cent in the province of Perm and 6.2 per cent in the province of Olonetz, in all 82.5 per cent in northern Russia. Of the Siberian forests 30.9 per cent are situated in the province of Tobolsk, 17 per cent in the Maritime province, 16.9 per cent in the province of Tomsk, 16 per cent in the Amur region and 8.8 per cent in the Trans-Baikal region. The forests cover an area of about 54,000,000 acres in central Asia and about 13,500,000 acres in the Caucasus. Russian forests furnish excellent timber and represent one of Russia's greatest resources. Nevertheless the lumber industry in Russia is still in its infancy. A very large part of Russia's forests, especially in Siberia, has not been surveyed at all. Under the old régime no serious attention was paid to conservation of the forests. In some places, as in the Ural Mountains, forests were being destroyed. The income from them was extremely low. Before the World War the net income of the government from the state-owned forests did not exceed 12 cents per acre, and in Asiatic Russia it was as low as one mill per acre. The total value of exports of lumber and timber from Russia for the calendar year 1913 was $84,850,000. It may be safely anticipated, however, that the lumber industry has a splendid future and will play a very important part in the national economy of the country.

II. Cattle, and Meat Industry.— Russia possesses vast prairies, suitable for extensive cattle breeding. Nevertheless the number of cattle per capita of population in Russia is one-fourteenth that of Argentina and less than one-half of the per capita of the United States. Taking eight sheep or three hogs as equivalent to one head of cattle we find in Russia 390 heads of cattle to every 1,000 of population, whereas the respective figure for Argentina is 5,320, and that for the United States 860. It must further be borne in mind that the livestock of Russia's peasantry is of an inferior quality compared to that of Argentina and the United States.

The number of heads of animals by geographical divisions in 1912 is shown in the following table:

GEOGRAPHICAL DIVISION	(000 omitted) Horses	Cattle	Sheep and goats	Hogs
European Russia and Poland	22,337	32,842	37,531	11,132
Caucasus	1,892	5,627	10,781	1,174
Siberia	4,506	5,306	5,141	1,092
Central Asia	4,435	5,122	20,613	111
Total for the empire.	33,170	48,796	74,066	13,509

The meat industry in Russia is still predominantly a small scale industry. Centralization is practically unknown. Prior to the Revolution there were no packing concerns like those in the United States. Refrigerating installations and cold storage plants first made their appearance shortly before the World War.

III. Mineral Resources and Mining.— The mineral resources of Russia have scarcely been explored, yet from the available sources of information it can be stated as a fact that Russia is very rich in all kinds of minerals. As far as *iron* ore is concerned, Russia doubtless holds the first place in the world, although not all iron ore deposits have been explored or surveyed. The iron ore deposits of the Ural Mountains occupy the first place, not only in Russia, but in the whole world. The mountain Blagodat alone contains over 100,000,000 tons of iron ore; the mountain Magnitnaya over 100,000,000 tons. The surveyed deposits of the Ural Mountains contain more than 500,000,000 tons of iron ore. The Ural iron ore is of a very high quality, containing no less than 65 per cent of pure iron and a very small quantity of sulphur. In the Donetz Basin, in southern Russia, there are two deposits of iron ore of high quality; in Krivoi Rog and the Kerch Peninsula the total surveyed deposits exceed 1,000,000,000 tons. There are also several deposits of iron ore in central Russia, but these are of a lower grade and the ore itself is of a lower quality. The iron ore deposits of Siberia have not been explored at all, but several deposits are known in the Minusinsk district, in the Trans-Baikal province in the Amur district, in the Ussuri province, in the Bay of Saint Olga, near Vladivostok, etc.

The *coal* deposits are not as plentiful. The greatest coal deposits in European Russia are situated in the Donetz Basin. Large deposits of bituminous coal exist in the western and central parts of the basin and anthracite in the eastern part. The bituminous coal is of very high quality, and good coke for metallurgical purposes is produced, but the geological conditions are not as favorable as in England or in the United States. The anthracite of the eastern part of the Donetz Basin (Grushevskaya Moolda) ranks as the best in the world. The second place in the Russian Empire was held by the Dombrowo Basin, in Poland, which has now been detached from Russia. The coal deposits of central Russia are of a low grade (brown coal and lignite). The Ural Mountains contain no deposits of good coal suitable for coking. The deposits of coal in the northern and central parts of the Ural Mountains contain only brown coal and lignite. In the southern part of the Ural Mountains (the Orenburg region), deposits of anthracite are found. In the Caucasus there are some deposits of coal containing a large supply of high grade coal. In Siberia there are very rich coal beds. The best coal deposit is that of Kuznetsk (in the Tomsk province), whose geological conditions are much more favorable than those of the Donetz Basin. Coal beds are found all along the Siberian Railroad at short distances from one another, also in the Maritime and Yakutsk provinces, and in the Fergan province in central Asia. Good beds are worked in the Augersky (Tomsk province) and Cheremkhovsky (Irkutsk province) mines. There are very rich deposits of excellent coal on the island of Sakhalien, in the northern part, belonging to Russia. Although the coal deposits of Siberia have not been explored and surveyed, yet from all indications it may be

safely assumed that the reserves of coal there are very large.

The *oil* fields of Russia are likewise unexplored. The best-known fields are found in the Caucasus. The fields of Balakhani, Sourakhani, Sviatoy and Grozny furnish about 85 per cent of Russia's total oil production. Oil is also found on the Taman Peninsula, in the region of the Pechora River (Oukhta in northern Russia), in the Transcaucasian region, between the Caspian Sea and the Ural Mountains, in the province of Fergan (central Asia) and on Sakhalien Island.

Copper ore deposits are situated mainly in Asia, viz., in the Ural Mountains, in Siberia, Minusinsk, Akmolinsk, Semipalatinsk, in Turkestan, in Fergana and in the Caucasus, but also in the provinces of northern Russia. The richest *manganese* ore deposits are situated in the Caucasus (Chiaturi) and next in southern Russia. There are known, also, manganese ore deposits in the Ural Mountains. The richest *gold* ore and placer deposits are located in Siberia, the Lena deposits in the province of Yakutsk, along the river Vitim, in the Nerchinsk and Barguzin districts, in the Amur region, in the Maritime region and in the Altai Mountains. Next follow the Ural Mountains. Gold is also known to exist in Kamchatka, Sakhalien and in the Caucasus. *Platinum* deposits, the richest in the world, are located in the Ural Mountains. *Silver* and *lead* ore deposits are located in Siberia — in the Altai Mountains, in the Ural Mountains and in the Caucasus.

There are large deposits of phosphates, pyrites, asbestos, graphite, marble, very extensive peat fields, deposits of mica, mercury and nickel. There are also deposits of precious and semi-precious stones, of rare metals, such as tungsten, osmium, vanadium, molybdenum, iridium, etc.

The development of the Russian mining industry is at a very low stage, especially if contrasted with the country's rich mineral resources. The leading part in Russian mining is played by the Donetz Basin in South Russia, which appears from the following comparative figures of production of the principal minerals in the Russian Empire and the Donetz Basin:

AVERAGE ANNUAL PRODUCTION 1912 AND 1913.

MINERAL	Total for the empire. Metric tons	In the Donetz Basin. Metric tons	Per cent of total
Coal	34,000,000	23,000,000	68
Coke	4,200,000	4,200,000	100
Iron ore	8,900,000	6,300,000	71
Pig iron	4,400,000	3,000,000	68
Cast iron and steel	3,900,000	2,200,000	56
Salt	610,000	190,000	31
Manganese ore	1,000,000	270,000	27

The Donetz Basin is also important as a producer of heavy oils, coal tar and other chemical by-products of the coke industry.

The second place in the mining industry belongs to the Caucasus. In 1913 it supplied 85 per cent of the total of oil, 70 per cent of the total of manganese ore, 56 per cent of the total of silver and lead ore, 96 per cent of the total output of lead, 30 per cent of that of copper and 24 per cent of the total of silver.

Coal.— The growth of the coal mining industry in Russia is shown by the following figures:

YEARS	Long tons	YEARS	Long tons
1870	700,000	1910	24,600,000
1880	3,200,000	1911	28,100,000
1890	5,900,000	1912	30,700,000
1900	15,900,000		

The principal sources of the output of coal previous to the war were the Donetz Basin, which produced 68.6 per cent of the total for the empire in 1912, and the Dombrowo Basin, in Poland, which produced 20.7 per cent of the total. All other regions produced only 10.7 per cent of the domestic supply. The geographical distribution of the production of coal in the empire, exclusive of Poland, in the year 1912, is shown in the following table:

GEOGRAPHICAL DIVISION	Per cent of total for the empire
Donetz Basin	86.4
Eastern Siberia	5.3
Ural	3.8
Western Siberia	2.9
Central Russia	0.9
Turkestan	0.4
Caucasus	0.3
Total	100.0

In addition to her domestic production of coal, Russia, previous to the war, depended for over one-fifth of her supply upon imports, mostly from Great Britain, and partly from Germany.

Iron.— The development of the iron industry of the Russian Empire and its geographical distribution appear from the following figures:

GEOGRAPHICAL DIVISION	Iron ore: Long tons	Iron ore: Per cent	Pig iron: Long tons	Pig iron: Per cent
South Russia	5,700,000	70.3	2,800,000	67.7
Ural Mountains	1,800,000	22.5	800,000	19.8
Central Russia	300,000	3.6	100,000	3.2
Poland	300,000	3.6	400,000	9.3
Total	8,100,000	100.0	4,100,000	100.0

The relatively small production of pig iron in the Ural Mountain region is due to the fact that it has no coking coal and uses charcoal for producing pig iron. Therefore the Ural region produces the finest kind of sheet iron, its only competitor being Sweden, which also uses charcoal for smelting iron ore.

Oil.— The production of crude oil (naphtha) in 1913 amounted to 9,000,000 long tons, of which 97 per cent was produced in the Caucasus and the rest mostly in central Asia.

Gold.— The production of gold in the Russian Empire in 1910–12 averaged 1,350,000 ounces Troy, of which 80 per cent was produced in Siberia and 20 per cent in the Ural Mountains.

Platinum.— Russia is the chief source of the world's supply of platinum. The world's production in 1912–14 averaged 280,000 ounces Troy, of which the Ural Mountains contributed 263,700 ounces, i.e., 94.1 per cent, British Columbia, 4,800 ounces, i.e., 5.3 per cent and other countries 0.6 per cent.

Copper.— The production of copper has rapidly grown since the beginning of the present century, as appears from the following table:

YEAR	Pounds
1900	17,700,000
1910	50,000,000
1911	57,500,000
1912	73,900,000
1913	75,600,000

About one-half of the output of copper comes from the Ural Mountains. In 1913 the geographical distribution of the production of copper was as follows: Ural Mountains, 50 per cent; the Caucasus, 29 per cent; Siberia, 16 per cent; all other sections, 5 per cent. The domestic production of copper in Russia was insufficient to supply its demand. About 20 per cent of Russia's consumption of copper in 1908–12 was supplied by imports from foreign countries.

Manganese.— The production of manganese ore in 1913 reached 1,130,000 long tons, of which 77 per cent was produced in the Caucasus and 21 per cent in southern Russia. Previous to the war the Russian Empire held the foremost place in the world's market of manganese ore. The annual exports from Russia in 1911–13 averaged 924,000 long tons, as against 706,000 long tons from British India and 168,000 tons from Brazil. Notwithstanding her rich deposits of high grade manganese ore, Russia produced no high grade ferro-manganese and imported it from abroad.

Salt, etc.— Among other mineral products of Russia must be mentioned salt, of which 1,900,000 long tons were produced in 1912; also silver and lead, zinc, pyrites and asbestos.

Wage-Earners in the Industries.— The number of wage-earners employed in the principal mining industries in 1908 is given in the following table:

INDUSTRY	Number of wage-earners
Coal	148,555
Gold and platinum	81,235
Oil wells and refineries	33,400
Iron ore	29,705
Copper mines and smelters	21,369
Salt	11,514
Silver, lead and zinc mines and smelters	3,428
Manganese ore	2,855
Total	332,061

IV. Manufactures.— An index of the development of manufactures in Russia is furnished by the statistics of establishments subject to factory inspection, which comprise all manufacturing establishments with mechanical power, employing not less than 16 wage-earners. The principal results of the census of such factories, taken in 1908, are presented in the following table:

INDUSTRY	Number of establishments	Number of wage-earners	Value of products	Horse power
			Roubles	
Textile	2,959	823,300	1,384,600,000	549,700
Metallurgical	2,330	551,900	761,900,000	590,200
Food products	7,948	386,400	1,576,500,000	387,100
All others	6,773	492,400	929,300,000	549,400
Total	20,010	2,254,500	4,652,700,000	2,076,200

The first place among Russian manufactures was held by the textile industries, of which the cotton factories were the most important. The number of spindles in the cotton factories of the Russian Empire and Finland in 1913 was 9,213,000, which represented 6.4 per cent of the total for the world.

Next in importance after the textile industries were the metallurgical mills, including metal working and machine factories. In general this industry was far behind its rivals in the more advanced industrial countries, both in equipment and efficiency. Still there were a few large plants with modern machinery. The largest factories were owned by the government and produced chiefly munitions of war. These establishments were mostly centred in and around the seat of the Imperial government, which accounts for the industrial growth of Saint Petersburg.

Of the privately owned enterprises, those located near the sources of coal and iron were largely controlled by French capital, which also controlled metallurgical works and coal mines in that section.

The domestic production of machinery in Russia was considerably short of the demand for it and the imports of machinery from abroad were the most important items of Russia's import trade.

The chemical industry was among the rapidly growing industries of Russia. According to the census of manufactures of 1908 there were 466 factories with 64,645 wage-earners, and an annual production of 177,279,400 roubles. The value of products had increased since 1900 by 91 per cent.

Among the most favored industries was the beet sugar industry, which enjoyed an export premium from the government. In truth the exports of sugar from Russia were made possible only by the poverty of the mass of the peasantry which regarded sugar as a luxury. The total number of sugar factories in 1911 was 299, with 142,630 wage-earners and with a total production of 1,853,000 long tons of sugar. The area of sugar beet plantations connected with sugar mills and refineries was 1,350,000 acres.

V. Effects of the War and of the Revolution.— The preceding statistical figures have at present only a historical value. The abnormal conditions brought about in Russia by the World War, the Revolution and the civil war have resulted in a complete breakdown of Russian industries. Industry in Russia had become totally disabled even prior to the overthrow of the Tsar. The official publication of the National Manufacturers' Association of Russia, *Promishlennost i Torgovlya* (Industry and Commerce), discussing this problem in its issue of 28 Nov. 1917, notes the fact that the «depression which had manifested itself during the prerevolutionary period was growing during the first five months of the revolution, and became very marked toward the fall.» («The Industrial Breakdown,» by P. Samoylov, p. 280). The author holds that this abnormal condition «was due primarily to lack of fuel and raw material and other economic causes.» According to official data collected by the Ministry of Commerce and Industry of the first Russian provisional government, during the five months following the overthrow of the Tsar, 568 industrial establishments were forced to shut down, and 104,300 employees were thereby thrown out of employment. These figures do not include those establishments which managed to go on with a reduced force.

The principal cause of the shutdown of the

largest establishments which had given employment to one-half of all the workers thrown out of work was lack of fuel. Lack of materials was next in importance. Lack of cotton was responsible for the closing of eight establishments which had given employment to 28,800 workers. On the other hand, lack of orders and financial losses were reported only from 12 per cent of all establishments employing less than 10 per cent of the total number of workers.

The industrial situation in the month of October 1917 is characterized by the shipments of coal from the Donetz Basin which, as has been seen, is the chief coal-producing centre of Russia. During the month of October the shipments of coal amounted only to 1,440,000 short tons, of which nearly two-thirds were consumed by the railroads. This left only 504,000 short tons for the supply of all industrial establishments, which was about one-third of their regular demand for fuel.

The cessation of the war was followed by the closing of munition factories and other war industries. The secession of Ukrainia and the Caucasus deprived Russia for a time of her principal sources of fuel. The blockade was directly responsible for the lack of cotton which forced the closing of cotton factories.

The breakdown of the transportation system was, perhaps, the most potent cause of the crisis of Russian industry. It is a well-known fact that the war totally destroyed the efficiency of the Russian railways. On 1 Oct. 1917, the number of disabled locomotives reached 5,551, while work in the repair shops was practically discontinued for lack of metal and fuel. On 31 Dec. 1917, 22,000 loaded cars accumulated at the Moscow railway depot for lack of locomotives to haul them. The Soviet government attempted to relieve the industrial breakdown by a broad scheme of nationalization of industry.

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13. BANKING AND FINANCE. Russia's extremely agricultural character makes her banks and banking far less important than her enormous size and population would warrant us to expect. Neither in number nor in magnitude can Russian banks compare favorably with those of west European countries, let alone the United States. Indeed, banks are a comparatively recent institution in Russia. There were no commercial banks at all in that country before 1865, when the first of them (with a capital of 4,000,000 rubles) was established. Nor was their subsequent growth very rapid. The close of the last century still found only 39 such institutions in the whole empire, though their total capitalization approximated 350,000,000 rubles. By 1910 their number had decreased through consolidation to 31, though the number of branch-banks had more than doubled during the decade in question (increasing from 242 to 492) and the capitalization reached the half-billion-ruble mark. Within the next five years, years of unusual industrial and commercial development in Russia, the number and importance of Russia's business banks grew amazingly. In 1915 there were 53 main and 743 branch banks, with a total capital exceeding 1,200,000,000 rubles. The World War, naturally, interrupted this rapid general development of Russian banking though in its first years it seemed to stimulate even a more rapid growth in certain directions. According to the last statement of the Russian State Bank, published on 6 Nov. 1917 — and no more recent reliable data are available at this writing — Russia then had in circulation no less than 19,000,000,000 rubles, with one and a third billions of gold reserve. The total paper currency had grown from 3,260,000,000 rubles in 1913 to about 25,000,000,000 rubles (est.) in 1918, with a greatly depleted gold reserve. Despite the prevailing panic caused by revolutionary conditions, the People's Bank of Moscow was so swamped with deposits that it was opening new branches all over the country to handle their amazing amounts — amounts which during four months of 1917 increased from 353,000,000 to 781,000,000 rubles. But just at the close of that year the Bolshevik government seized all the banks, which shared the sad fate of most other institutions under that régime.

In imperial times the Bank of Russia acted in the double capacity of State bank and commerical bank. The State Bank, the government bank of issue and directly under the control of the Minister of Finance, was the central unifying banking institution that gave the Russian banking system its soundness and stability. Before the World War it was the largest bank in the world so far as actual deposits were concerned. Protected and controlled by the State Bank were numerous State savings banks, established to promote thrift among the people. The government guaranteed all their deposits and fixed their rates of interest. None of their capital could be used for state expenditures, and only profits in excess of 10 per cent went to the government. Losses were met by a reserve fund built up from profits *under* the 10 per cent maximum permitted by the State Bank. The growth of these popular savings banks, which were represented by at least 10,000 branches all over the country, has been phenomenal. According to the official report made by the Russian Minister of Finance in 1916, the deposits in these savings banks increased by over 3,500,000,000 rubles in the first two years of the Great War. The growth of deposits in the State Bank amounted to 854,000,000 rubles during the first 18 months of that war. Besides these general banks, Russia before the Revolution had special banks, such as mortgage banks, land banks, etc. The functions of these different kinds of loan banks are indicated by their names. It should be noted, however, that the land banks were specially designated as the Nobles' Land Bank and the Peasants' Land Bank, each doing an enormous business before the Great War — over 3,200,000,000 and 5,000,000,000 rubles, respectively, in 1913. There were 36 municipal credit societies in Russia on 1 Jan. 1915, having a total capital exceeding 150,000,000 rubles; while the 53 joint-stock banks for commercial credit had a total capital of about 837,000,000 rubles on 1 July 1915, with deposits approximating 2,900,000,000 rubles the previous year. The principal banks of the latter kind before the World War were the Petrograd International Bank of Commerce (capital 90,000,000 rubles), the Russian Bank for Foreign Trade (capital 80,000,000 rubles), the Azov-Don Bank of Commerce (capital 75,000,000 rubles), the Russian-Asiatic Bank (capital 65,000,000 rubles), the United Bank of Commerce (capital 46,000,000 rubles), the Russian Commercial and Industrial Bank (capital 45,000,000 rubles), the Volga-Kama Bank of Commerce (capital 31,000,000 rubles), and the Siberian Trade Bank (capital 31,000,000 rubles). All these banks had numerous branches — some as many as a hundred — in various parts of Russia, with headquarters invariably at Petrograd.

The government revenues and expenditures of Imperial Russia were classed under the two general heads of *ordinary* and *extraordinary*, with numerous and confusing sub-classifications. The principal sources and gross amounts of Russia's "ordinary" revenues, as enumerated and officially estimated in rubles for 1915, were as follows: (1) State domains — government railroads, banks, mills, factories, timber sales, etc. — 1,700,000,000; (2) Indirect taxes — customs receipts and revenue from sales of tobacco, alcohol, sugar, matches, petroleum, etc. — 699,000,000; (3) Duties — revenue stamp receipts, passport charges, taxes on freight and passenger railroad transportation, etc. — 514,000,000; (4) Direct taxes — taxes on land, real estate, capital, trade licenses, etc. — 375,000,000; (5) State monopolies — mining industries, coinage, liquor traffic, post office, telephone, telegraph, etc. — 326,000,000; (6) Reimbursement of treasury expenditures, 124,000,000; (7) Land redemption — payments on land purchased by exserfs and other peasants — 1,900,000; (8) Sale of state domains — forests, lands and other natural resources — 1,850,000; and (9) Miscellaneous revenues — military tribute, municipal contributions, payments on railroad and Crown debts, etc. — 15,200,000. If we add to these "ordinary" revenues the 155,000,000 rubles estimated as "extraordinary" revenues for the same year, the bulk of which was to come from state loans, we find Russia's estimated revenues for the first year of the World War mounting up to nearly 3,912,000,000 rubles. Counting the population of the empire as 180,000,000 in 1915 (a conservative estimate), these vast revenues came to about 21⅙ rubles per capita.

At least 20 items made up the "ordinary" and "extraordinary" expenditures of the Russian government in its imperial days. The former included all the fixed or regular expenses connected with the various ministries; the latter, naturally, most of the irregular or variable disbursements of the government. The cost of running Russia's 11 ministries, which constituted the bulk of her ordinary expenditures, was estimated for 1915 as follows (in rubles and round numbers): Ministry of Ways of Communication, 752,000,000; Ministry of War, 590,000,000; Ministry of Finance, 357,000,000; Ministry of the Interior, 203,000,000; Ministry of Marine, 199,000,000; Ministry of Education, 159,000,000; Ministry of Agriculture, 143,000,000; Ministry of Justice, 101,000,000; Ministry of Commerce and Industry, 57,430,000; Ministry of the Imperial Court, 16,300,000; and Ministry of Foreign Affairs, 7,700,000. The other "ordinary" expenditures for that year included 440,000,000 rubles in payment of state debts, 52,500,000 rubles to the Holy Synod, 8,830,000 rubles for the higher government institutions (Imperial Council, the Duma, etc.), and 27,000,000 rubles in miscellaneous expenses.

The "extraordinary" expenditures were fewer in number and smaller in total amount. There were just four general government outlays under this head during 1915. These were 78,400,000 rubles spent by the Ministry of War; 66,000,000 rubles expended on railway extensions; 9,400,000 rubles devoted to the construction and improvement of ports; and 1,072,000 rubles paid out in railroad subsidies. This makes a grand total of 3,268,632,000 rubles for all estimated expenditures, "ordinary" and "extraordinary," for the year in question — which, on the bases used above, amounted to about 18⅙ rubles per capita.

Of course these figures do not include Russia's enormous war expenditures, which the Russian Minister of Finance placed at 10,000,000,000 rubles for 1915 alone. That the cost of the World War to Russia, as to the other belligerent nations, increased as the struggle continued, goes without saying. Specific estimates by years vary greatly, but Russian authorities place the whole cost of the World War to Russia at 56,599,275,699 rubles.

The rapid growth of Russia's national debt during the war is another means of gauging its cost. This increased from 8,811,380,000 rubles on 1 Jan. 1914, to 32,300,000,000 rubles on 1 Sept. 1917, when Russia no longer figured in the war. To cover this and subsequent deficits, Russia made several internal war loans, some of which were taken up abroad, and at least two foreign loans, amounting to $100,000,000, placed in the United States, which alone is believed to have extended financial aid to Russia approximating $325,000,000. Just what the financial situation in that country is at the present moment, with the Bolshevik government still in power, cannot even be conjectured. With all her pre-Bolskevik government loans repudiated by this reckless régime in 1918, and with her unprecedented issues of unsecured paper money, Russia's financial credit at home and abroad has already reached the lowest ebb in her whole precarious history.

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14. RAILWAYS, HIGHWAYS AND WATERWAYS. Russia's enormous size makes her means of transportation and communication even more essential than these vital factors generally are in smaller countries. Yet, neither her railroads nor her waterways have been developed or utilized to anything like their maximum efficiency, both lagging behind Russia's industrial and commercial progress.

This is especially true of the Russian railroad system, which, while it is the second largest in the world in point of trackage, falls far behind those of England, Germany and the United States in actual efficiency. The growth and development of Russia's railroads has been very rapid, however. Beginning in the sixties of the last century, when but 264 miles of tracks were constructed annually, and passing through a period of tremendous development between 1895–99, when the annual increase of lines averaged 1,915 miles, the development of Russian railroads reached its highest point just when the Great War broke out — and, naturally, interrupted it. Conflicting figures are given for the total mileage of Russian railroads immediately before the World War.

In 1917, according to the American Railway Commission in Russia, the total mileage of all railroads in European and Asiatic Russia (exclusive of Finland) approximated 43,300. Only about 25 per cent of these railroads were then double-tracked. Before the Russian Revolution (q.v.) about two-thirds of Russia's vast railroads belonged to the government, the rest being owned by private companies. Despite their poor equipment and inefficient operation, Russian railroads carry enormous numbers of passengers and mountains of freight. No very recent statistics are available here, but in 1914 a total of about 250,000,000 passengers and 235,000,000 tons of freight were transported by Russian railways. What the figures were during the war, with its unprecedented movements of men and supplies, can only be conjectured at present.

The principal Russian railroad lines connect the outlying provinces of central, southern and western Russia one with another and with the chief Baltic, White Sea and Black Sea ports. Moscow, the centre of Russia's greatest industrial region, is naturally the most important Russian railroad centre. Next comes Petrograd, the actual commercial centre of Russia, which is linked with the older Russian capital by the Nicholas Railroad. Nijni-Novgorod, the leading commercial city on the Volga, ranks third as a railroad centre. Connected with Moscow by the Nizhni-Novgorod Railroad, it is a great distributing point for much of the grain that comes from such agricultural trading centres as Kazan, Riazan, Samara and Saratov. Another railroad, the Moscow-Kursk, connects Moscow with the densely populated governments of central and southern Russia; and still another, the Moscow-Briansk, connects it with the city of Kiev, the fourth largest city of Russia. The Riga-Orlov Railroad runs directly to the port of Riga, on the Baltic, and connects that important city with those of four or five adjacent governments, finally making a junction near Dvinsk with the Warsaw Railroad. The Yelets and the Griaze-Tsaritsin lines help to connect the fertile black-soil region of southern Russia with the western part of the country. The Petrograd-Warsaw and the Moscow-Brest lines connect Petrograd and Moscow with Poland and the Austrio-Prussian frontier. Then there is, of course, the great Trans-Siberian Railroad (q.v.), the longest continuous railway in the world, which connects such remote cities as Petrograd and Vladivostok, 5,435 miles apart by rail, which is one and three-fourths times the distance from New York to San Francisco by the shortest route. This enormous railroad, costing over $172,525,000 in initial outlay and taking nearly 12 years to build—it is being extended by branch lines and made more efficient by double-tracking all the time—is double-tracked from Omsk to Vladivostok, a distance of 3,566 miles, which exceeds the distance across the whole American continent. The Trans-Siberian Railroad has given a great impetus to commerce and agriculture in both European and Asiatic Russia and has greatly promoted Siberian immigration. In the Great War, when it was naturally taxed to the utmost, its services were inestimable. The much-needed lesson taught Russia by the exigencies of that unprecedented war is being improved by the above-mentioned railway commission, which has already increased the efficiency of Russian railroads to a very considerable extent.

Russia's internal waterways, covering so large a part of two continents, are naturally the longest in the world. The country is intersected by numerous rivers, lakes and canals which afford direct water communication between the Caspian Sea and the Arctic Ocean, between the former and the Baltic and between the Baltic and the Black Sea. Exclusive of Finland, European and Asiatic Russia has about 250,000 miles of waterways. But, owing to the lowlands through which they pass, Russian rivers are generally not very deep. Hence only about half their mileage—not more than 132,000 miles, at any rate—represents really navigable waters, the rest being navigable by rafts and small sailing vessels. Moreover, most of Russia's internal waterways are practically ice-bound in winter and some are greatly affected by drought in summer, especially in their southern reaches. Yet, despite these handicaps, about one-third of Russia's immense freight is transported by water, which still affords by far the cheapest means of communication. And the proportion of waterway to railway transportation in Russia is bound to increase rather than diminish as time goes on, judging from the vast and numerous waterway improvements projected by the Executive Committee on Water Transportation during the Great War.

There are six large river systems in the former Russian Empire—two in Europe and four in Asia—and these, with their numerous connecting canals, make up a network of waterways unsurpassed anywhere else in the world. Of the two European systems, that of the Volga River is by far the larger. It lies in the East and includes the waters of the Neva Basin as well as those of the northern Dvina, which empties into the White Sea. The other European Russian river system is that of the Dnieper, which flows south into the Black Sea. This is the Western system and includes, besides the Dnieper Basin itself, the basins of the Western Dvina, the Nieman and the Vistula, which link together the Black Sea with the Baltic. The two systems, together, afford a continuous water route between points so distant as the city of Astrakhan, on the Caspian Sea, and Petrograd, on the Gulf of Finland, 2,540 miles apart.

The principal river systems in Asiatic Russia are those of the Ob River, the Yenesey, the Lena and the Amur. The first is the largest and most important, comprising all the rivers of the West Siberian plain north of the Russian Atai and northern Mongolia, with at least 7,000 miles of navigable waters. The Yenesey system, second in size, drains about 870,000 square miles of Siberian territory and has a total of 4,500 miles of navigable waters. The Lena River system comprises over 5,000 miles of navigable waters and drains the northern Irkutsk region as well as the greater part of northeastern Siberia, an area exceeding 1,000,000 square miles. Finally, the Amur system, which drains the Russian Far East, affords another 5,000 miles of navigable water routes. Together, all these vast waterways, connecting here and there with the Trans-Siberian Railroad, have been one of the greatest promoters of Siberian colonization and expansion. The maintenance and control of Siberia's river systems, as well as of the large and deep Lake Baikal (a fresh water lake of unlimited possibilities), is vested in the Russian Department of Ways of Communication, which recommends and makes necessary improvements. The future of Siberia undoubtedly depends quite as much upon her vast waterways as upon any other single factor, the great Trans-Siberian Railroad not excepted.

A country so predominantly agricultural as Russia must of necessity depend a great deal on wagon roads and highways for means of transportation and communication. While Russia's ordinary wagon roads are apt to be impassable in spring and fall, they afford very cheap transportation facilities the rest of the year, especially in winter, when sledging is almost universal. It is then that Russia's agricultural and other products can be transported most conveniently from the villages to the towns and railroad stations by millions of peasants whose time is all their own. There are about 75,000 miles of ordinary (unpaved) roads and over 15,000 miles of post (macadamized) highways in European Russia alone. The latter connect all the principal cities, thus linking together such important centres as Moscow, Petrograd, Warsaw, Kiev and Kharkov. The post highways, over which millions of passengers travel in winter and summer, were built by the tsars, but are kept in repairs by local authorities and the rural communities through which they pass.

There are at least six kinds of roads and highways in Asiatic Russia: (1) Main highways, (2) caravan roads, (3) local roads, (4) colonization roads, (5) by-roads and (6) commercial highways. Space does not permit a description of the character and function of each, except to add that the principal road in the first class (the famous Sibirsky-Tract) alone exceeds 4,000 miles in length, that the local roads (some 61 in number) have a total mileage of 16,000, and that there were about 6,600 miles of colonization roads in 1913. Most of these Siberian roads are of a rather primitive character, though examples of more modern highways are not unknown even in this undeveloped part of Russia.

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15. ARMY AND NAVY. At least three vital factors have combined in the past to make a large standing army essential to Russia's political integrity and imperial well-being: (1) Her vast territorial extent, which made three practically separate armies necessary; (2) her diverse and very numerous ethnic elements, which made racial revolts an ever-present danger; and (3) her peculiar geographical position, which necessitated a very considerable army to guard her extensive frontiers. Fortunately, Russia's enormous population, a population which has always enabled her to put more men under arms than any other nation in Europe or America, makes it comparatively easy to supply any number of soldiers needed in peace or war. Thus, while her standing army before the Great War probably did not exceed 1,700,000 trained men, Russia could always mobilize twice that number. In the World War she had no less than 12,000,000 men under arms, with perhaps as many millions more under training.

Like most other European countries, imperial Russia had universal and compulsory military service, which she first established by law in 1874. Theoretically, every able-bodied male between the ages of 21 and 44 was liable to conscription; but exceptions and exemptions were quite numerous. Finally, many of the non-Slavic races found in the Russian Empire—such as the aborigines of Siberia, the inhabitants of Turkestan, the Caucasians, and the subjects of the grand duchy of Finland—being deemed undependable, were permanently exempted from military service. Such exemption, however, involved considerable exemption taxes in the case of the Finns and Turkestanians, at least. These and other ways, honest and dishonest, of evading military service in Russia made conscription there much less onerous than it is elsewhere in Europe.

The number of conscripts to be called annually was usually determined by the Imperial Senate in accordance with recommendations made by the Minister of War. Thus the quota of new recruits would vary from year to year. Immediately before the Great War about half a million men were drafted out of the 1,300,000 liable for military service; and on this basis had not the war intervened the number of recruits would have increased by about 150,000 annually for the ensuing year or two. The general demoralization following the Russian Revolution naturally wrought havoc with the Russian army, greatly depleting its ranks through wholesale desertions and undermining its morale through premature relaxation of discipline. With the conditions existing under the Bolshevik régime, several rival armies have long been operating in various parts of Russia. The largest and strongest of these would seem to be that of the Bolshevik government, called "the Red Guards," and composed largely of mercenary troops and German officers.

The Russian army in pre-revolutionary times had the usual four branches—infantry, cavalry, artillery and engineers—to which the Great War has added an indispensable fifth, the aviation branch. The infantry consisted of regulars, Cossacks, militia and what corresponded to the German Landsturm. Only the first of these divisions maintained its full strength in time of peace, while the Cossacks' ranks were normally kept at one-third their war strength. The conditions and length of service varied slightly before the World War, but were generally as follows: For the infantry and the artillery, three years in the active army and 15 years with the first reserves; for the cavalry and other branches, four years in the active army and 14 years with the first reserves; and for all of them five years with the second reserves. This makes a total liability to military service of 23 years for these particular branches, while the Cossacks' liability is practically lifelong. The latter, after two years' training at home, entered the active district regiment of the first order at 21. After four years of active service there came four years' leave of absence, which meant service in regiments of the second order, with a month's military training every year. Then followed another four years of active service in regiments of the third order and five

years with the reserves, after which the Cossack, splendidly trained and well disciplined, belonged to the Landsturm division.

The term of military service would be reduced by five years for university graduates, who served but two years in the line and 16 with the reserves, and graduates of secondary schools, who served three years in the line and 15 with the reserves.

For military purposes imperial Russia was divided into 14 districts, each in charge of a district commander. In 1914 the Russian army had 37 army corps, each of which generally consisted of two infantry divisions, an engineer battalion and sometimes a division of cavalry. On a war footing an army corps had between 36,000 and 40,000 men. Two of the three separate armies maintained by Russia before the Great War were stationed in Europe. There were some 40,000 or 50,000 frontier guards permanently on the Austrian, German, Rumanian and other frontiers. Behind these guards, in the various military districts, were the regular army corps. The principal military headquarters in European Russia in time of peace were located at Saint Petersburg, Moscow, Kiev, Kovno, Grodno, Vilna, Minsk, Odessa, Riga, Revel, Warsaw, Lodz, Kharkov, Smolensk, Vitebsk, Simferopol, Dorpat and Brest-Litovsk. The Caucasian army, consisting of at least four cavalry divisions, had its headquarters at Tiflis and Alexandropol. There were, besides, considerable forces (some 150,000 troops) stationed in central Asia, while those normally in the Far East were by no means negligible. Military schools and academies were quite numerous in Russia before the Revolution and, naturally, were located near military headquarters.

Russia's navy has not attained such high rank among the navies of the world as her unlimited resources would seem to have made possible. But the Russians, it should be remembered, are not naturally a seafaring people, and shipbuilding is with them a comparatively recent art. It was Peter the Great (q.v.) who first organized the Russian navy as one of his pet ideas, but it never amounted to much until comparatively recent times. Its growth was so slow at first that only in the early part of the last century did it attain third rank among the world's navies. Even this rank was lost after the Crimean War, and such relatively small navies as the Turkish, Italian and German were in the middle of the 19th century easily surpassed Russia's naval strength. But late in that century (in 1884) a new naval program was begun in Russia which by 1895 again raised her navy to third rank. Such naval progress was not long sustained, however. In the Russian-Japanese War Japan's more modern fleet easily and decisively defeated Russia's squadron near Tsushima. Since that disastrous defeat Russian naval reform and expansion have gone on apace, though effective reorganization began only in 1911. The full naval program as then projected involved the construction of 24 new battleships, 12 battle cruisers, 24 lighter cruisers, 108 destroyers and torpedo boats and some 36 submarines. The entire program was to be carried out by 1930, when the Russian navy would indeed have become very formidable. The Great War interrupted this huge naval program which, from present indications, will never be completed.

Before the war with Japan Russia maintained four separate naval squadrons — one each in the Pacific Ocean, the Baltic, the Caspian and the Black seas. Before the World War the entire Russian navy consisted of some 200 vessels of various types, with a total displacement of approximately 408,000 tons. These warships included seven battleships (five of the dreadnought type), seven battle cruisers, five armored cruisers, seven fast and other cruisers, 118 destroyers, 40 submarines and 15 torpedo boats. But these figures give no adequate idea of the nature and size of the Russian navy in the Great War, in the first years of which many important additions must have been made as vessel after vessel then building was completed. The actual increase from this source has never been tabulated. It could hardly have offset Russia's considerable naval losses during the war, which were greatly augmented by revolutionary conditions, especially under the Bolshevik régime. What the Germans did not sink or capture of Russia's navy — and the Black Sea fleet nearly all fell into their hands — Bolshevik maladministration ruined or rendered impotent.

Before the revolution Russia had three principal navy yards at Petrograd — the Baltic works, the New Admiralty Yard and the Galerny Island Yard — one each at Kronstadt, Sevastopol, Vladivostok, Reval, Libau, and Helsingfors.

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Special Authority on Russian Subjects.

16. RUSSIA AND THE WORLD WAR. The immediate cause which brought Russia into the conflict was a declaration of war by Germany on 1 Aug. 1914, following an ultimatum requiring that Russia should demobilize within 12 hours. On being asked by the Russian Foreign Minister (M. Sazonov) whether the inevitable refusal of Russia to this curt summons meant war, the German Ambassador replied that Germany would be forced to mobilize if Russia refused. Up to this stage there were but two belligerents — Austria-Hungary and Serbia, and they had opened hostilities only two and a half days before. In reply to a message from President Wilson to the effect that the United States stood ready at any time to mediate between the warring powers, the German emperor on 10 Aug. 1914 handed Ambassador Gerard a personal letter to the President. This document was first made public on 5 Aug. 1917. In it the emperor stated that a general order of mobilization issued by the tsar on 31 July 1914 had rendered war inevitable. This theory was upheld on the German side for a considerable period of the war, for in his maiden speech to the Reichstag on 19 July 1917 the new German Imperial Chancellor, Dr. Michaelis, stated that Germany was forced into the war "by Russia's secret mobilization, which was a great danger to Germany." On 5 September of the same year he repeated the charge, saying it was "now irrefutably established that it was not Germany who had chosen the time for the war, but a military party surrounding the tsar, which was under the influence of France and England." Against this view may be set the statement by Prince Lichnowsky in his famous memorandum: "On 30 July, when Count Berchtold [Austrian foreign minister] wanted to give way, we [Germany], without Austria having been attacked, replied to Russia's mobilization by sending an ultimatum to Saint Petersburg, and on 31 July we declared war on the Russians, although the tsar had pledged his word that so long as negotiations continued not a man should march — so that we deliberately destroyed the possibility of a peaceful settlement . . . it is not surprising that the whole civilized world outside Germany attributes to us the sole guilt for the World War." The oft-repeated question of "mobilization responsibility" — as to which state was the first to mobilize — has been much canvassed. At noon on 31 July 1914 there was proclaimed throughout Germany a "state of danger of war" (Kriegsgefahrzustand), the preliminary step to mobilization. At 4 P.M., four hours later, the kaiser telegraphed to King George, ". . . I have just heard from the Chancellor that intelligence has just reached him that Nicholas, this evening, has ordered the mobilization of his entire army and fleet." It will be observed that there is a discrepancy of one day between the account of the kaiser and that of his Ambassador. An acute analysis of this subject may be found in 'Current History' (Vol. XIII, p. 496) from the pen of Dr. David Jayne Hill, former United States Ambassador to Germany. (See also ib., Vol. XII, pp. 473–475). Russian foreign relations with certain powers are treated under separate heads. See ALLIANCES; AUSTRIA-HUNGARY AND THE WAR; BALKAN LEAGUE; BALKAN WARS; BERLIN CONGRESS; EASTERN QUESTION; PERSIA; RUSSO-JAPANESE WAR; RUSSO-TURKISH WARS; TRIPLE ALLIANCE; TRIPLE ENTENTE; WAR, EUROPEAN: HISTORICAL INTRODUCTION and DIPLOMATIC HISTORY.

Throughout the period preceding the Crimean War the relations between Russia and Great Britain had been of a friendly nature; such controversies as arose from time to time were always amicably settled. That friendship dated back to the middle of the 16th century, when Ivan the Terrible concluded a commercial treaty with Queen Elizabeth and even aspired to win her hand. In 1806 Alexander I instructed his ambassador setting out for London that "Russia and England are the only powers in Europe which for many years to come cannot be jealous of one another or have conflicting interests." Two disturbing elements arose, however, that were destined entirely to change the course of European history — Russian expansion in central Asia and the Turkish Empire. In time Russian opinion veered round to the view that Great Britain was the natural and implacable enemy of the Russian nation and its vital interests, while in Great Britain there grew up a conviction that an attitude of jealousy, distrust and hostility was alone possible toward Russia. A dread of a Russian invasion of India seized the British imagination. This began about 1830, but already in Pitt's time England became alarmed at Russia's victories over the Turks and it was seriously proposed to send a fleet to assist the latter. It is immaterial at this date to revive the question of whether the so-called "Testament" of Peter the Great or of Catherine II provided for the acquisition by Russia of the Bosporus and Constantinople, but it may be asserted that the trend of Russian policy toward Turkey pointed in that direction. "The Turkish government is the enemy of the human race," wrote Prof. Spenser Wilkinson over 20 years ago; "it is a rule of bestial force, of corruption, of lies and of unrighteousness. The duty of Europe is to make an end of it, and to set up a civilized government in its place. But Europe has never been able to do this because the Powers are divided." Within these few words lies half the history of Europe during the 19th century. Discussing Turkey with the British Ambassador on 9 Feb. 1853, the tsar Nicholas I said, "we have on our hands a sick man, a very sick man. I tell you frankly it would be a very great misfortune if he should give us the slip some of these days, especially if it happened before all the necessary arrangements were made." Five days later he told the Ambassador that he would not allow England to gain a foothold in Constantinople, but would engage not to establish himself there, "that is, as a proprietor, I do not say as a guardian." He also hinted that he might be obliged by circumstances to occupy Constantinople. The Crimean War quickly followed, in which Great Britain, France and Sardinia fought on the side of the Turks against Russia. Nearly 50 years later Lord Salisbury confessed that in this war Great Britain had "backed the wrong horse." At the close of the Russo-Turkish War of 1877–78, England and Russia nearly came to blows again over Constantinople, but once more was the Turkish Empire saved from destruction. From 1863 dates the steady advance of Russia in central Asia; Afghanistan and Persia became zones of friction with England; in the Balkans, Russian aims clashed with those of Austria, while in the Far East, Japan looked askance at the Russian approach through Manchuria to the Sea of Japan. From 1872 to 1895 there were periodical wranglings between Russia and England over the boundaries of Afghanistan; the arrival of a Russian army at Merv in 1884 produced in England what the 8th Duke of Argyle facetiously described as "a violent attack of Mervousness." More than perhaps any other great European power, Russia followed a consistent foreign policy; with plodding perseverance she aimed at securing an ice-free outlet to the sea, in the Far East and on the Persian Gulf. Her conquests in central Asia brought peace, order and security to that region; she abolished slave-raiding, constructed railways and introduced modern industrialism. While material progress was fostered, however, education was not attempted.

In 1888 France lent Russia 500,000,000 francs ($100,000,000), thus paving the way to the Dual Alliance. Democratic France allied herself with autocratic Russia chiefly because she feared a German attack. Year by year the indebtedness of Russia increased, until at length economists began to ask whether Russia was not paying the interest on her old loans with the principal of her new borrowings. Russia began to enjoy the security of the reckless debtor: she could always ask for more, because if more were refused France might lose all that she had embarked. After the accession of Tsar Nicholas II in 1894, the German emperor so successfully played upon the young tsar and the French Foreign Minister, M. Hanotaux, that Germany became a *quasi*-silent partner in the Dual Alliance. French diplomacy

multiplied difficulties with England in Africa and Asia. The Franco-German-Russian combination directed its energies to isolate England. At the close of the China-Japanese War in 1895 the terms of the Treaty of Shimonoseki were dictated by the European triumvirate to the detriment of Japan, who was compelled to evacuate Port Arthur, taken from the Chinese. This proceeding drove Japan into the arms of England and to prepare for her revenge. The year 1898 stands out in bold relief as a momentous epoch in world history. The Spanish-American War was in progress; a European coalition against the United States loomed on the horizon; France was in the throes of a semi-civil war over the Dreyfus case; with England she stood on the verge of war over Fashoda; the Franco-Russian alliance was neutralized, even paralyzed; Italy and France were at daggers drawn; the United States annexed Hawaii; Russia took Port Arthur and Talienwan; England took Weihaiwei, and France obtained a 99 years' lease of the Bay of Kuang-Chau-Wan. But perhaps the climax of that eventful year was the issue, in August, of the tsar's famous "Peace Rescript" to the world, calling for a general disarmament. France was infuriated; her dream of *revanche* was shattered. In the same year, too, Austria and Russia arrived at a Balkan agreement, while the kaiser landed in Palestine, dressed in the garb of a Crusader, and assigned to himself the protection of the Holy Places, which the Pope had refused him. At Damascus he declared himself to be "at all times" the friend of the 300,000,000 Mohammedans in the world.

For the time being Russia stood as dictator of the world's affairs, backed by France and Germany. The territorial scramble in China seemed to presage the break-up of the Celestial Empire. England stood isolated, helpless to intervene on behalf of the Armenians or to prevent the Greco-Turkish War. With the outbreak of the South African War in October 1899 the tripartite coalition — or at least Germany — made strenuous efforts to bring about active intervention, but both Russia and France drew back. At the time of the Boxer Rebellion in 1900 Russia occupied Manchuria, promising to hand the territory back to China on 8 Oct. 1903. In 1902 came the Anglo-Japanese Alliance. Russia failed to evacuate Manchuria on the stipulated time, and on 9 Feb. 1904 Japan commenced hostilities without a declaration of war. On the battlefields of Mukden, Japan wiped out her score of Shimonoseki with Russia; by the Treaty of Portsmouth, Russia relinquished Manchuria to China and made her leasehold rights on the Liao-tung Peninsula (which included Port Arthur), over to Japan. The Russian disaster changed the political situation and profoundly disturbed the balance of power, for one partner of the Dual Alliance was temporarily eliminated. Relations between Russia and England had been severely strained during the war over the North Sea incident, when the Baltic fleet had fired on British trawlers, believing them to be Japanese torpedo boats.

From 1898 onward a new under-current had been working under the troubled diplomatic waters. In that year M. Hanotaux had been replaced at the Quai d'Orsay by M. Théophile Delcassé, to whom fell the task of settling the Fashoda incident with Great Britain. It was he who realized the peril of a conflict between those two countries and resolutely set himself to remove it. While Russia was being battered by the Japanese, M. Delcassé concluded (8 April 1904) the Anglo-French Agreement and established the Entente Cordiale. That move stunned Germany, for the incredible had happened. After the Japanese War, Russia seemed to have reached the limit of her borrowing facilities. The French banks with the government behind them refused to assume the sole responsibility for floating another Russian loan. When Lord Lansdowne left the Foreign Office in December 1905 he had already begun the negotiations which were to end in the Anglo-Russian Agreement of 1907. Sir Edward Grey pursued them and by the spring of 1906 the alliance was virtually concluded, though the convention was not signed till 31 Aug. 1907. In March 1906 a great Russian loan was floated in London and Paris — the first one in London since 1854. From this period, Russia drew liberally on British capital up to the European War. Thus were three quondam enemies brought into the same political orbit by an "understanding" against the Triple Alliance, though there was not, as in the case of the latter, any specific stipulations for mutual defense. Between Russia and England, Persia still remained the apple of discord. With Austria, Russia had once been on good terms. In the Revolution of 1848 it was Russian troops that had saved the throne and empire of Francis Joseph. Austria repaid this obligation by mobilizing on the Russian frontier during the Crimean War, thus contributing to Russia's defeat. For over a century the Dual Monarchy had opposed Russian ambitions on the Bosphorus and had directed covetous eyes toward Salonika. Russia, to her credit be it remembered, had been the chief instrument in liberating the Balkan States from Turkish rule. She had also constituted herself the protector of the Slavic Balkan nationalities. But Austria had greater interests in the peninsula. The populations were her next-door neighbors and she had millions of Slavs under her rule. Pan-Slavism constituted a real danger to the state. Russia was further away; only Rumania, neither a Slav nor strictly a Balkan state, touched her borders. Slav and Teuton seem born enemies; the evolution of the former is one of natural growth as opposed to that of forced development; he has never bartered his individuality for any preconceived higher cult, and it was just this Slav element within her gates that contributed most effectively to the collapse of Austria in 1918. Her traditional policy of suppressing rising nationalities necessitated the procedure of keeping the Balkan Slavs weak and divided among themselves and against themselves by promoting strife between them. This policy of mischief-making was prompted by self-preservation and directed against Russia. The latter power was by no means guiltless of intrigue. She worked for the elimination of the Turk from Europe and the strengthening of Serbia. Austria and Germany were interested in holding together the Turkish Empire, upon the assistance of which they reckoned in a war with Russia. Austria had repeatedly

threatened Serbia and Montenegro with war, in the full knowledge that Russia would immediately intervene by force. As the Russian Foreign Minister informed the British Ambassador on 25 July 1914, Austria's bellicose attitude toward Serbia "was in reality directed against Russia. She aims at overthrowing the present *status quo* in the Balkans and establishing her hegemony there."

Russian relations with Germany had been more intimate than with any other country, physically, if not spiritually. Since the days of the early Muscovite tsars Russia had been overrun with German officials, originally invited to introduce Western methods. They supplanted the natives in administrative positions and were hated by the people over whom they ruled. The large number of German names borne by Russians to-day bear witness to this. Frequent intermarriage between the nobility of the two countries brought it about that Russian society, from the court downward to the bureaucracy, was permeated with German ideas and influence. But while the Germans regarded Russia with contempt as an inferior race, they feared her on account of her strength in man-power. Frederick the Great had suggested the partition of Poland between Russia, Prussia and Austria; when that was accomplished, all three were equally interested in preserving their Polish territory, thus forming a tacit union between them. From that period every revolt in western Europe was represented to Russia as a menace to all sovereigns, ever since the first French Revolution. The same policy was energetically pursued by Bismarck. Russia had been largely instrumental in delivering Prussia from Napoleon I, and had again come to the aid of Prussia in 1870 by threatening Austria with immediate war if she came to the aid of France. But for this, the Franco-German War might have been avoided. At the Berlin Congress in 1878 Bismarck stood against Russia, and when he had formed the alliance with Austria against Russia and France, he concluded another pact — the "re-insurance treaty" — with Russia against Austria. Bismarck is credited with having pushed Russia into war with Turkey in 1877, and William II induced her to waste her strength against Japan in 1904.

The agreement with England in 1907 completed the Triple Entente, the bond that held solidly together despite outside efforts to shake it. Russia remained firmly with her allies through a succession of shocks — the Bosnia-Herzegovina crisis of 1908, Agadir, the Balkan wars and, finally, into the Great War. With her inexhaustible man-power and her vast natural resources, Russia was indeed an invaluable ally, but the weak points in her armor were soon to be disclosed. She had entered the war heavily handicapped. Her factories and transport services were deficient, and could neither furnish nor distribute the supplies required by the army and the civil population; it was only by a reckless sacrifice of life that she won her early victories. Soon, owing to the shortage of shells, rifles and munitions, the army was left almost defenseless before the enemy, and many of the troops had to fight with sticks and stones. As disaster succeeded disaster in the field, the undoubted enthusiasm with which the nation had responded to the call to arms gradually cooled; enemy agents sowing dissension completed the breakdown of Russia.

So-called "Willy-Nicky" telegrams which had passed between the German emperor and the tsar in 1904–07 (published in the *New York Herald* Aug.-Sept. 1917), showed that the kaiser had persuaded the tsar in 1905 to participate in a coalition against England. These negotiations, however, antedate the Anglo-Russian Agreement. The secret treaty between the two monarchs was shortly after torn up by Count Witte. The Allied diplomats who were personally acquainted with the tsar have never doubted his loyalty. Russia's tremendous military efforts during the first two years of the war literally saved the Allied cause.

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17. RUSSIA, DIPLOMATIC RELATIONS OF THE UNITED STATES WITH. The United States and Russia, with their many striking examples of similarities and contrasts, have had between them some curious and interesting sympathies but no important political relations. Their relations, although not intimate, have usually been friendly — and were especially so from 1861 to 1867.

In the period of the Revolution, the ruling empress, Catherine II, with all her professions of neutrality, showed no acts of sympathy for the revolting English colonists, although several Russian Poles allied themselves with the American cause.

The traditional friendship between them originated in various acts of Alexander I who succeeded to the Russian throne in March 1801. President Jefferson, who since 1786 had been interested in Pacific trade, in 1803 (in connection with the Lewis and Clark expedition) suggested plans for commercial communication between the United States and Asia via the Northwest Coast. In November 1803, although no treaty had been arranged with Russia, he sent a consul to Saint Petersburg. The Russian Foreign Minister in May 1808 requested the negotiation of a treaty regulating trade with Alaska which American vessels had visited for trading purposes since the beginning of American nationality. He complained of American clandestine trade in arms and ammunition with the Indians, and soon thereafter he suggested a southern boundary limit which the United States rejected because it was far south of 55 degrees which the emperor had designated as the southern boundary in 1799. In June 1808, Russia appointed Daschkoff as consul-general at Philadelphia and also chargé-d'affaires at Washington where he presented his credentials on 11 July 1809. At the same time Jefferson secretly sent William Short on a special mission to request Russia to protect American commerce against aggression of the European belligerents, but after reaching Paris he waited for additional instructions and finally returned without going to Russia, his appointment having been rejected by the Senate just at the close of Jefferson's administration.

John Quincy Adams who was commissioned Minister Plenipotentiary to Russia on 27 June 1809 remained in Saint Petersburg until April

1814, when he took his leave. Although there had been difficulty in getting admission to Russian ports and in determining the limits of the Russian settlements, he found a willingness to adjust all causes of friction. The emperor took a lively interest in American affairs — showing an "obstinate attachment" of which there were frequent evidences in the decade that followed. In the War of 1812, doubtless inspired chiefly by desire to strengthen Great Britain in contest against Napoleon rather than by friendship for the United States, he offered mediation to secure termination of hostilities in a war which was for the United States inglorious. Later he was selected to arbitrate one of the difficulties resulting from the war and the Treaty of Ghent, and in 1822 decided that Americans were entitled to an indemnity, the amount of which was fixed at $1,204,960 by a mixed commission.

By 1817 the importance of establishing a defined southern limit to Russian settlement in America was considered. In 1816 Russian traders from Alaska established a fort at Bodega Bay in what is now California, north of San Francisco, and another at Atooi in the Sandwich Islands. In 1821 the tsar by ukase gave to a Russian company exclusive right to territory as far south as 51 degrees and threatened to make the northern Pacific a *mare clausum* by excluding foreigners from the seas within 100 miles from the coast.

Against this Russian policy the United States co-operated with Great British in remonstrance, and President Monroe incorporated a manifesto in his famous declaratory announcement of 2 Dec. 1823. Finally, Russia, refusing the bribe of California which Mexico had offered for a recognition of Mexican independence, yielded to the combined protest of the United States and Great Britain, and on 17 April 1824 concluded her treaty with the United States fixing the parallel of 54° 40′ as the southern boundary of Russia and also providing for freedom of trade for 10 years and granting the right to fish along the coasts of Russian America, except in the rivers and harbors; but, after 10 years, believing that the privilege had been abused, she refused to renew the agreement for allowing either fishing or trading.

In the meantime Russia continued to maintain a spirit of apparent goodwill toward the United States, co-operating with her in regard to Spanish American affairs, taking an interest in a proposed arbitration between the United States and England, and assisting the United States in arranging contemplated negotiations with Turkey.

In 1832 the United States negotiated with Russia a treaty providing for reciprocal liberty of commerce and navigation and also reciprocal liberty of sojourn and residence in order to attend to their affairs and with the same security and protection as the natives.

After 1835, although the Van Buren administration in 1839 complained of the Russian pretension to exclusive dominion on the northwest coast and a year later exhibited some anxiety in regard to a lease of the Russian American dominions by the Hudson's Bay Company, the continuation of good feeling was shown by the continued expression by the Russian government of a friendly interest in American relations with Great Britain just before the negotiation of the Webster-Ashburton Treaty.

Although connection between the United States and Russia was slight they continued to remain on good terms and on several occasions before 1861 acted in harmony in the Far East where both secured advantages from English and French victories which opened China to intercourse with the commercial powers. American relations with Russia at once became more important following the extension of the American boundaries to the Pacific in which consequent increase of American interests invited changes and enlargements of policy. Realizing this, Secretary Clayton in 1850 invited Russia to accede to the Clayton-Bulwer Treaty and Secretary Webster in 1851 declared to Russia the policy which the United States was disposed to pursue in regard to the Sandwich Islands. In 1854, and throughout the Crimean War, certain influential American newspapers openly expressed sympathy for Russia. On 22 July 1854, Secretary Marcy negotiated with Russia a convention on rights of neutrals. At the same time, Russia was extending to the United States facilities in negotiating a commercial treaty with Persia.

The diplomatic correspondence indicates a good American understanding with Russia from the close of the Crimean War to the opening of the Civil War. The Russian government agreed to Marcy's doctrine as to the Declaration of Paris and was ready to take the initiative in the effort to extend the principles over Europe. There was a desire for increase of intercourse between the two countries. Early in 1858 Stoeckl, the Russian chargé-d'affaires at Washington, was raised to the rank of minister plenipotentiary, and in 1858–60 there was conference and friendly co-operation as to joint interests in China and the opening of the Amoor to free trade. It was seen that the friendly relations between the two countries would favor the United States much in the development of the Pacific and Eastern trade, which would increase with the growth of the Frazer River settlement and extension of a railway to the Pacific. In December 1859, Russia was sounded on negotiations for the cession of Alaska for $5,000,000 which the Russian government regarded as inadequate but as meriting deliberation.

The continuous growth of Russo-Amerian cordiality after the opening of the War of Secession was significant. In 1861 the two governments agreed to co-operate in establishing cable connections between Saint Petersburg and San Francisco by way of Bering Sea and Siberia. Throughout the war which threatened the integrity and strength of the American Union, Russia remained friendly to the government at Washington. In 1862 she refused to join in Louis Napoleon's proposal of mediation or intervention in the American War; and, in 1863, when a revolt in Poland caused apprehension of an Anglo-French diplomatic intervention there as well as in America, she demonstrated her goodwill toward the American government by sending a fleet on a friendly visit to American waters causing various rumors and suggestions of a possible Russo-American alliance. In 1866 the American Congress recognized the friendship of this international amenity by sending Gustavis V. Fox, Assistant Secretary of the Navy, with a formidable vessel of the navy on a special mission to Saint Petersburg to congratulate Emperor Alexander II on his escape from an attempted assassination. In return for this mission which was received with imposing ceremonies, Russia (a year later) planned to send the Grand Duke Alexis on a visit to America.

A fitting climax to this strange paradoxical friendship appeared in the negotiations resulting in a treaty of 1867 for the transfer of Alaska which, although it had been suggested as early as 1845 and contemplated again in 1854 and in 1859, surprised the diplomats of the Old World.

Although the absence of conflicting interests after the transfer of Alaska seemed a guarantee against serious dispute new sources of controversy arose, first, in connection with Anglo-American negotiations for adjustment of serious questions, and later, from reactionary Russian policy after the death of the liberal Emperor Alexander II in 1881.

Near the close of 1870 when a series of events contributed to hasten the American negotiations with Great Britain for the adjustment of the Alabama claims, Constantin Catacazy, the Russian Minister who since his arrival in 1869 had interfered in questions not appropriately connected with his legation, suggested to Fish that the condition of European affairs indicated that it was an opportune time to press for an immediate settlement which he expected to result in the American annexation of Canada, but Secretary Fish proposed to the British Minister Thornton a basis of settlement which omitted any mention of Canada and resulted in the famous Treaty of 1871 for the peaceful settlement of Anglo-American difficulties — doubtless much to the surprise of Russia. Catacazy continued to use methods at variance with diplomatic practice to defer or to prevent a peaceful adjustment with England. He did not hesitate to use the newspapers to influence the public on questions pending before the government. His continued methods of interference to prevent the successful execution of the provisions of the treaty whose negotiation he had unsuccessfully attempted to prejudice and defeat made him intolerable and finally induced the American government (in July 1871) to suggest his recall and later impatiently to urge it, notwithstanding the "intimate ties of amity" between the two governments. Secretary Fish acceded to a postponement of the recall only because Russia found his removal inconvenient and impracticable until after a prearranged visit of the Grand Duke Alexis.

Although after the close of the period of the "entente cordiale" there appeared evidence of continued friendship — such as resolutions unanimously adopted by the United States Senate in March 1881 denouncing the assassination of Emperor Alexander II and extending condolence, and the promotion of popular sympathy by American shipments of food to relieve the famine sufferers of Russia in 1892 — the chief subjects of correspondence in the last quarter of the 19th century were sources of friction and irritation.

An extradition treaty signed on 28 March 1887 met strong opposition in the United States from those who urged various objections against treating Russia with the same consideration as countries such as Great Britain or Switzerland, but after six years of delay its ratification was advised by the Senate (February 1893) and it was proclaimed by the President in June 1893. In 1894 an agreement for a *modus vivendi* in relation to seal fisheries was concluded. In September 1900, by exchange of notes, a claims protocol submitted to arbitration certain differences relating to American claims.

After 1890 earlier friendly relations gradually changed and after 1898 became increasingly unsatisfactory by the aggressiveness of Russian diplomacy and by repressive measures of Russian internal administration. Americans condemned the harshness of the Siberian exile system, published to the world by articles of George Kennan in 1888–89, and the increasingly reactionary spirit of government authorities shown in severe treatment of Poles and Jews — many of whom emigrated to the United States in increasing numbers, destitute and with their tales of woe to spread a hatred of the land from which they had fled. In 1903, following the horrible massacre of Kishinev which was believed to have been instigated by government authorities, the Washington government brought the subject into publicity by an unusual and unsuccessful inquiry whether the Russian government would receive a petition from American Jews. In 1904 President Roosevelt expressed the American nation's condemnation of the outrage at Kishinev.

Russian aggressiveness in diplomacy became a larger source of danger. Germany and Russia, who in 1895 were foremost in intervening to deny to Japan the legitimate fruits of her victory over China against the latter's exclusive policy, in 1897 seized strategic positions in China which, together with demands for vast concessions, threatened the complete exclusion of the United States. In the Spanish-American War, Russia favored Spain and participated in a movement to make a European question of Cuba.

Thus in connection with the revolution in international relations after 1898 a wider divergence of Russo-American interests resulted from events in the Far East. The threatened disintegration of China induced the American government to propose (6 Sept. 1899) a policy of "open door," largely directed against the exclusive trade policies of Russia in Manchuria where the recently constructed trans-Siberian Railway gave her special advantages. Later (1900) the American government presented a courteous reminder of Russia's promise to evacuate Manchuria whose occupation appeared to menace American trade and manufacturing interests. A continuation of the controversy was a sequel of the peace-making in China following the Boxer troubles.

In the Russo-Japanese War, American public opinion favored Japan to a high point of enthusiasm, causing considerable astonishment and anger to many conservative Russians, but at the close of the war bitter feelings were softened by President Roosevelt's successful initiation in facilitating peaceful negotiations resulting in the Treaty of Portsmouth and by later American sympathy for reforms in Russia.

Although Russia showed gratitude for the peace, her subsequent acts in violating the open door principle in Manchuria resulted in a di-

vergence of policy in the Far East, again causing friction, chiefly illustrated in the American propositions to internationalize the railroad system of Manchuria under Chinese management and with foreign capital in order to eliminate the political purposes of Russia and Japan. It was further illustrated in the new facilities offered to Russian encroachment in Manchuria and Mongolia following the Chinese revolution of 1911 resulting in the American note of 3 Feb. 1912. In Persia also in 1911, the American government viewed with some concern the Russian action in forcing Commissioner Shuster to leave the country.

In 1912 Secretary Knox secured the right of the United States to participate in a loan needed by the new Chinese government, resulting in an arrangement (of June 1912) for a loan shared by bankers of six powers. After the rise of new difficulties resulting from hesitation of China and the imposition of new conditions which China in her extremity was compelled to accept, President Wilson, 18 March 1913, reversed this policy in recognizing the new Chinese republic, and withdrew government support from the combination of the six-power loan.

Meantime, on 7 July 1911, the United States and Russia together with Great Britain and Japan concluded at Washington a treaty for joint protection of fur-seals and sea otters in the north Pacific above 30° latitude for a period of 15 years.

The serious dispute in regard to non-admission (even for short visit) of American Jews into Russia, whose government had never officially abandoned the theory of perpetual allegiance, finally led to an American agitation for abrogation of the Russo-American commercial treaty of 1832.

As early as 1873 Secretary Fish protested against Russian treatment of American citizens of Jewish birth as a violation of the treaty of 1832, to which Russia replied that the treaty must be interpreted in accord with requirements of Russian domestic law. The importance of the subject increased by increase of intercourse and in 1880 Secretary Evarts and in 1881 Secretary Blaine vigorously protested to no avail — as did Frelinghuysen in 1884–85 and Bayard in 1886. The subject was investigated by Secretary Olney in 1895 and in 1902 Secretary Hay at the request of Congress made a detailed report showing that Russia was clearly violating provisions of the treaty of 1832. The United States had been inactive from a desire not to offend Russia, but a large Jewish immigration, and consequent political and business influence, finally led to offensive action in the House of Representatives in 1911 through the passage of an intemperate resolution ordering the abrogation of the treaty. The Senate proposed a more diplomatic substitute resolution which was unanimously adopted. Meanwhile President Taft properly informed Russia of the intention to abrogate by a year's notice as provided in the treaty.

Thus after seeking ineffectually for over 30 years by deliberate processes of diplomacy to persuade Russia to observe the treaty, the United States resorted to the remedy provided by the express words of the treaty, and on 1 Jan. 1913 the treaty was abrogated. The action met a strong protest from reactionary Pan-Russian leaders. Unsuccessful steps were at once taken to negotiate a new treaty on a basis satisfactory to the United States. The issue was not one easily settled by compromise or by arbitration. As each party showed no disposition to recede from its position no progress was made in negotiations.

After 1914, with the disappearance of many causes of alienation and with the probability of a satisfactory understanding in regard to China and Japan, American opinion was again disposed to be friendly to Russia — and especially to sympathize with the struggle for liberal reforms in government.

A general arbitration treaty signed in October 1914 was proclaimed 25 March 1915. A protocol of agreement concerning exportation of embargoed goods from Russia to the United States was signed at Washington 23 Sept. 1915.

During the earlier phases of the Russian revolution, the American government with a view to encouragement and aid sent a mission headed by Elihu Root, whose achievements were soon canceled by the development of the revolution, near the close of 1917, under control of unscrupulous Bolshevik-German agents acting solely in the interests of Germany.

Many look forward to the re-establishment of genuine good feeling after Russia has again recovered her international influence through a satisfactory solution of her internal crisis whose end it is still difficult to foresee and futile to forecast.

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RUSSIAN COSSACKS. The name of Cossack is derived from the Russian *Kazak*, which in turn came from a Tatar word, meaning adventurer, rover, freebooter. The Cossacks of the former Russian Empire enjoyed certain special privileges in return for which they were obligated to render a very extensive military service, nominally from 18 to 50, practically from 18 to 38, of which 12 years in active service. The Cossack, under these agreements, was bound to furnish his own uniform, equipment and horse, the government providing merely his weapons, guns, etc. The officers were trained in special military schools, and this tuition was really better than that for the officers of the regular army in the rest of Russia. The general administration was kept separately for each *voisko*, and differed in each case. The central administration culminated in the Ministry of War in Petrograd, and there also, with the aid and advice of delegates from each *voisko*, new legislation for the Cossacks was discussed, deliberated upon and passed. In time of war the 11 Cossack *voiskos* supplied 890 mounted *sotnias*, or squadrons, each of 125 men; 108 sotnias of infantry, of equal strength; and 236 guns, representing 4,267 officers and 177,000 men, with 170,695 horses. But altogether they furnished 328,705 men for military service. The Cossack population of the whole of Russia numbered, according to the census of 1893, 2,648,049, and in 1905, 3,252,637, of which 1,573,898 were women. Altogether they owned 146,500,000 acres of land, 105,000,000 of which was arable and most of the remainder in forest. This land (leaving out of consideration the small space occupied by towns) was divided into *stanitzas*, or villages, the average rate of holdings per soul being 81 acres, with special grants to the officers, in lieu of pension, from *esaul* upward, leaving altogether about one-third of the whole land for future use. Altogether there were 11 Cossack *voiskos*, or tribes, settlements; namely, those of the Don, the Kuban, Terek, Dnieper, Astrakhan, Ural, Orenburg, Siberian, Semiryechensk, Amur and Ussuri. Their location, of course, was always along border lands, past or present, of more or less military or political importance. There are very few towns of any size within the Cossack holdings, and the *stanitza*, or Cossack village community, was and remains the unit. The *stanitzas* hold their land in common, on the principle of the Russian *mir*, but with wider attributes, such as village assembly, assessing taxes for local purposes or for the whole of their *voisko*, dividing the tillable land at regular stated intervals, providing schooling for the children, village grain stores and electing its *ataman*, or communal elder, its judges, etc. All this, of course, applies to conditions before the World War. Since the Bolshevist régime has been set up in the heart of the former empire, the Cossack communities everywhere have resisted the introduction of this economic and political system within their areas, mostly by force, and at this writing successfully.

As a rule popular education is more advanced among the Cossacks than among the remainder of the Russian populations, attendance being both larger in percentage and more regular. In addition to agriculture, which supplies more than their needs, leaving a considerable proportion for export, the Cossack population devote themselves largely to the breeding of horses and cattle, to viticulture in the Caucasus, to fishing on the Don, the Caspian and the Ural, to hunting and agriculture, etc. The fructification of the mining lands within their territories is almost altogether left to non-Cossack strangers, the privileges being chartered out, or subject to an annual rent, to a percentage of the gross output or some other similar method of farming it, while trading and manufacturing are mostly permitted on payment of a license. From of old the typical Cossack despises trade, banking, manufacturing and similar occupations. Ethnologically considered the Cossacks are of mixed origin. They are conglomerate descendants of Russian, Lithuanian and Polish ancestors, fugitives mostly who had fled from serfdom and joined the free settlements of the Cossacks in the 16th and 17th centuries, and who mingled racially with the aborigines, Tatars and other tribes of Mongolian race, such as the Polovtsi. Physically the Cossacks are more hardy than the Russian proper, though they bear a resemblance to the latter, and share with him certain characteristics, but are physically more slender and supple, of bold, handsome features and dark, expressive eyes, and of vastly more energy and daring. The Cossacks are nearly all adherents of the Greek Orthodox faith, very devout in observing its tenets and ritual, intolerant of other creeds and violently anti-Jewish, hence the frequency of pogroms on territory settled by Cossacks. At different periods the Cossack hetmans, or military chiefs, have exercised greater or lesser power over their tribes or confederations, according to the times and circumstances. Some of them, by their innate genius, achieved supreme and autocratic prerogatives, with scarcely any interference by the kings of Poland or the tsars of Russia, as did Chmielnicki. But as early as Ivan the Terrible's reign the tsar was beginning to be acknowledged, first among the eastern branch of the Cossacks, as their overlord or suzerain, and at last the chief hetman of all the Cossacks became the tsarevitch, or eldest son of the Russian tsar, who assumed his power with certain ancient ceremonies, such as the investment with the *bulawa* and *bunchuk*.

History.— The Ukraine (i.e., «borderland»), extending from Kiev to the Black Sea, was the first home of the Cossacks, who under the nominal suzerainty of Poland, then by far the largest and most powerful country in the East, here grew and developed into a race of their own. A slow process it was. After the long Tatar and Mongolian invasion had at last subsided, before which the nomadic and roaming tribes had fled or been annihilated, the first small Cossack settlements were founded. These were constantly added to by hosts of fugitive serfs from the feudal estates of Poland, Lithuania, Muscovy, who joined the bands of rude and plundering freebooters along the eastern limits of the steppe. This went on steadily for three centuries, about 1400–1700, during which time the Don and Dnieper Cossacks founded warlike fraternities, with fastnesses along the river shores or on inaccessible islands. As early as 1514 the *Kazaki* were formed into companies and placed respectively under the command of the Polish frontier *starostas*, or governors, those of Kaniev, Kamenets, Cherkask, etc., but a shifting policy was pursued by Poland all along. It was altogether within the nominal domains of the Poland of that time that Cossack territories were located, and hence the earliest traces of Cossack history form a part of Polish history, although from the very start the Cossacks claimed a large measure of independence and autonomy, and in most instances succeeded in maintaining it. Nevertheless, undoubtedly Poland made use of the Cossack settlements and of the Cossack fighting spirit to protect her eastern and southern boundaries. But under various Polish rulers there were also erected by Poland strongholds, like Bar and Krzemi-

eniec, by which that commonwealth meant to defend herself both against the frequent murderous irruptions of the Tatars of the Crimea and Azov, and against the marauding or rebellious Cossacks. But a settled policy Poland had not. The *dzikie pola*, the "savage steppe," remained "savage" for three centuries. Up to 1500 in fact the large steppe, extending from the Dnieper to the Ural, had no settled population. Hunters and fishermen frequented its innumerable rivers. Shoals of runaway serfs from Poland, Lithuania and Muscovy, settled beneath the shelter of the stockades and armored blockhouses or watch towers built, from time to time, to guard the southern frontiers of Poland and Muscovy. The Tatars and Turks, being the declared foe of all Christians, the Cossacks exterminated them for centuries, wherever feasible, and went on frequent expeditions undertaken as a rule for the sake of booty. The latter in turn they sold to Poles or Muscovites, and this, as a matter of fact, for a long period was their largest item of revenue. The same motive impelled them in making their frequent raids along the shores and to the harbor cities of the Moslem Black Sea. These raids off and on became veritable naval battles, in which the Cossack light and easily managed long boats would prove superior to the clumsy Moslem galleys. One king of Poland, Vladislas IV, was so greatly hampered in his national policy by this guerilla naval warfare that he had to conclude a special agreement with the Cossacks regarding it. Like the Vikings of old, the Cossacks would undertake raids in their flotillas of light sail boats along the whole coast of the Crimea, then and for many years after under the power of the Khan, and to the opposite shores of the Black Sea, to Batoum, to Trebizonde, Samsoun, etc., burning, slaying, devastating all, and causing annually millions of damage, bringing home immense booty. They would now and then even, under the leadership of some specially bold adventurer, penetrate as far as the Sea of Marmora, to the very haunts of the sultan of Turkey, and this irrespective of whether the latter was at peace with Poland or not, thus often wilfully entangling the web of international statecraft.

The Cossacks had been little meddled with by their Polish suzerains, so long as they kept on defending the frontiers against the Tatars and Turks who made frequent inroads. The Don Cossacks, as early as about 1600, had definitely cut loose from their brethren, the Cossacks of the Dnieper, the so-called Zaporozhians, and from the time of Ivan the Terrible had at least nominally placed themselves under the authority of Muscovy, the determining reason with them for this step being that the Russians, like themselves, were of the Greek Orthodox faith. The Don Cossacks, however, were by no means steadfast in their allegiance. They kept wavering, sometimes neutral, at other times taking sides with one party or the other, as their ungoverned spirit inclined them. For the Cossacks of the Dnieper, though, who still remained under Polish suzerainty, there had been, throughout the whole of the 16th and the first half of the 17th century, a slowly accumulating list of grievances against their Polish overlords. The Poles, above all, living under a strictly feudal social and political system, had all along laid claim to territorial feudal rights over the whole Ukraine, including even the very Cossack belt of land on the Dnieper, a claim which the Cossacks had never admitted, they calling themselves the "Cossack Republic" or "The Free Brotherhood of the Dnieper." Now, from some time before 1600, and corresponding with the anti-Reformation set up by the Jesuits in Poland proper, another element of strife and dissatisfaction had been infused into the relations subsisting between Poland and her nominal vassals, the Zaporozhians; namely, the religious one. A persistent attempt was made, under Jesuit guidance, to turn the Cossacks and all the people of the Ukraine from adherents of the Greek Orthodox creed into Roman Catholics. Unwise harshness was shown in this long drawn-out proselyting campaign, and the whole Ukraine, but more particularly the actual Cossack portion of it, conceived a deep hatred for their oppressors. To facilitate the conversion of the Greek Orthodox inhabitants of the Ukraine the Poles had hit upon the expedient of founding, with the assent of the Vatican, a new branch of the Roman Church under the caption of the Uniate denomination, leaving intact the dogmas and ritual of the Greek Orthodox Church, with some slight modifications, but bringing it under the governance of the Roman pontiff. The Cossacks, therefore, and with them the Ukrainians as a whole, began to hate their Polish lords not alone as their feudal oppressors, but also as their spiritual ones, as heretics. The whole Ukraine was in a ferment during the 17th century. The Cossacks, with the assistance of the Ukrainian settlers, rose in rebellion, in 1635–36, and this rising was put down by Poland with the utmost difficulty. Retribution of the severest type was meted out by the Polish Diet. But the great rebellion that broke out in 1648, and which shook Poland to its very foundations, was the one at the head of which was Bogdan Chmielnicki, hetman of the Zaporozhians, or Cossacks of the Dnieper, one of the most singular and able men in history. By allying himself with the Tatars of Crimea, their foes of centuries, he in the spring of 1648 marched suddenly with all his available forces against the flower of Polish knighthood, and simultaneously there was a general uprising, terrible and bloody, by the settlements of the Ukraine — most of them also Greek Orthodox and descendants of Cossack forefathers. While Chmielnicki, with the help of the Tatars, defeated and destroyed one Polish army after the other, the serfs and settlers of the Ukraine wiped out nearly the entire race of Polish lords that had ruled them for so long. Every manor house was reduced to ashes; every lord destroyed with bestial cruelty — impaled, sawn asunder, flayed alive; every Catholic priest was hanged before his own altar, usually between a Jew and a slaughtered hog. On 23 Sept. 1648, at Pildawa the main Polish army of 40,000 was utterly destroyed. During the following three years Chmielnicki with his hosts made himself complete master of the whole Ukraine, and conducted himself like an independent sovereign, even receiving ambassadors from several great powers. But at last, on 1 July 1651, Bogdan Chmielnicki was defeated at Berestecko. But the fruits of this victory were not gathered by Poland, now hurrying to her destruction, but by Muscovy-Russia, while another result of this great feat of arms was that it did away forever with all dreams of Cossack independence. The Cossacks, little by little, transferred their allegiance from Poland to Russia.

There were, however, repeated attempts by a number of Cossack heroes or leaders to establish political autonomy. One of these was made by Stenka (Stephen) Razin, originally a hetman of the Don Cossacks, who was sent off on a diplomatic mission to the Kalmuck Tatars, and then made himself head of a piratical brotherhood. But in 1670 he openly rebelled against the government at Moscow. He captured Cherkask, Tsaritsyn and took Astrakhan, converting the latter into a Cossack republic. He spread rebellious doctrine as far as Nizhni-Novgorod, Penza, Tambov, etc., even Moscow. Razin proclaimed his object to be to root out the boyars and *tchinovniks* (officials), and to establish absolute equality, such as practised by the Cossacks within their commonwealths. A number of pitched battles were fought by Razin's adherents and the tzar's armies, but finally, one year later, Razin was captured at Kagalnik, and taken to Moscow, where after unspeakable tortures, he was quartered alive.

Mazeppa, whose full name is Ivan Stepanovitch, another Cossack hetman and man of ability, was born in the Ukraine, near Kiev, about 1640, and died on 22 Sept. 1709, in Bender, a fellow-captive of state with his ally, King Charles XII of Sweden. Byron's poem has made Mazeppa's name and romantic life history familiar to readers. In his youth, being then a page at the royal Polish court, a jealous husband had him strapped to the bare back of a vicious steed, and thus driven into the wilderness steppe. Being rescued by roaming Cossacks, he next became secretary to the Cossack hetman Ivan Samoilovitch, and himself hetman in 1687. He aided materially Peter the Great in his wars against the Turks and Tatars in Crimea and Azov. But later he turned against the tsar, and made the last attempt on a large scale of obtaining political independence for the Cossacks by allying himself with the Swedish monarch, sharing at last his defeat at Poltava, and his flight to Turkish territory where he breathed his last, having attained a ripe old age. Pugatcheff, also hetman of the Don Cossacks for a time, in 1773, during the reign of the Empress Catherine II, raised once more the standard of revolt among the Cossacks. He did so by pretending to be Peter III, the murdered husband of the empress, and his scene of action was the Volga region. For more than a twelve-month he kept the armies of the sovereign at bay, but was finally crushingly defeated, 2,000 of his supporters being killed and 6,000 taken prisoners, including himself. He was beheaded in Moscow. Pugatcheff's name and exploits still live in popular legends and ballads throughout Russia. During the World War now come to a close, the Russian Cossacks, as long as Russia remained in the field, have sustained their great warlike reputation, and at this writing it is one of their leaders, General Denikin, although fighting against tremendous odds, that successfully is opposing the Bolshevist fighting masses, just as it was another such leader, General Korniloff, who just before the accession of Lenine, would have saved Russia from Bolshevism if properly supported. What the ultimate fate of all the 11 Cossack settlements within the former empire is going to be is matter of conjecture merely. But if they are allowed their way they will enjoy autonomy.

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Wolf von Schierbrand,
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RUSSIAN PEOPLE, LEAGUE OR UNION OF, or UNION OF TRUE RUSSIANS (the "Black Band" or "Black Hundred"), a reactionary political group of Russia organized in 1905 to combat the rising revolutionary tendencies of the period, and powerful for about five years. Its members supported the traditional Russian régime, including autocracy, and sought to counteract revolutionary activities by employing terrorist methods against them. It was contended that the government secretly connived at their efforts. Their ranks were recruited from the nobles, and they maintained that Russian political troubles in general should be ascribed to the non-Slavic element of the population. They were particularly charged with organizing pogroms against the Jews. In the first sessions of the Duma the party was not strong, but by a manipulation of the suffrage laws they gained ascendency in the third Duma, one of their members, Prince Volkonsky, becoming its vice-president. The party was for a time the recipient of favor in high circles, but gradually lost its power through the disaffection of some of its members who disapproved of its extreme measures, as well as by internal quarrels, and a growing public sympathy for the measures and tendencies it was formed to suppress.

RUSSIAN THISTLE, a naturalized annual (*Salsola tragus,* one of the *Chenopodiaceæ*), becoming a dreaded pest in the northern and western United States. It is closely related to, and resembles, the prickly salt wort of the sea-beaches and in no way, except spininess, can be confounded with the true thistles. It is a glabrous, succulent, spreading bushy herb, with slender branches and small linear leaves, topped by a prickle, and usually bright red at maturity. Its small flowers are single in the axils, and are succeeded by hard little fruits surrounded by broad, the five-parted horizontal wing of the calyx, which is conspicuously veined. Like many desert plants, at

maturity, and in the dry season, its branches contract into a ball, enclosing its capsules full of ripe seeds, and it becomes a "tumble-weed," blown across the country by the wind, and scattering its seeds, to take root in favorable soils. Careful cultivation is the best way to exterminate the Russian thistle.

RUSSNIAKS. See RUTHENIANS.

RUSSO-JAPANESE WAR. See JAPAN.

RUSSO-TURKISH WARS. Ever since the conquest of Constantinople by Mohammed II in 1453, the Turks had been regarded as a perpetual menace to the Christian countries of Europe. The remarkable military achievements of the Osmanli; their enormous encroachments upon European territory, and, above all, their utter incapacity for equitable administration, plus the insuperable difference in race, creed and language, made them most undesirable neighbors to the Slav, Greek, Magyar, Latin and Teutonic peoples of southern and southeastern Europe. In 1547 the Turks acquired Serbia; Trebizond and Sinope in 1461; Wallachia in 1462; Bosnia in 1463; the Crimea in 1475; Albania in 1479; Otranto in 1480. Bayazid II (1481–1512) took Venice and parts of the Morea; Selim I (1512–20) made his fleet the terror of the Mediterranean, while his successor Suleyman the Magnificent captured Belgrade, Rhodes and Lower Hungary; his triumphant progress was arrested only at the walls of Vienna in 1529. By the first peace treaty between Austria and Turkey (22 June 1533) the sultan received the right to sanction any arrangement about Hungary. In 1534 Suleyman attacked Charles V in the Mediterranean and made the Turks supreme in both the eastern and western basins of that sea. The Turkish fleet attacked Italy in 1537, and Venice was compelled to make a truce with the Porte in 1539. Hungary was invaded for the fourth time in 1541 and a Turkish government was established at Buda; further places were seized in Hungary, Croatia and Slavonia in 1544; Szegedin fell in 1552, and Chios in 1566. In 1571 Pius V organized the Holy League against the Turks, who captured Cyprus from Venice. But the turn of the tide was at hand. The battle of Lepanto (October 1571) shattered the reputation of invincibility which the Turkish fleet had attained, and in 1573 a new and formidable adversary appeared in the lists against Turkey — the power of Russia. The first proper Russo-Turkish War came in 1678; it ended in 1682 and secured the Ukraine and the Cossack territory to Russia. Other wars followed: in 1686 Russia began operations; two years later Transylvania renounced Turkish suzerainty and became a province of the king of Hungary, and in 1689 Russia joined forces with the Imperialists to fight the Turks on the Danube. In 1710, at the instigation of Charles XII, the Sultan Achmet III declared war on Russia. By the treaty of the Pruth (21 July 1711) Peter the Great gave back Azov to the Turks, destroyed all Russian fortresses on Turkish territory and made a definitive treaty of peace with Turkey in 1713. In 1715 the Turks conquered the Morea and the Venetian fortresses in Crete; in 1716 the Austrian Imperialists defeated the Turks at the battle of Peterwardein, and Temesvar, the last of the Turkish possessions in Hungary, fell 13 August. In 1726 Russia and Austria formed an offensive alliance for 30 years against Turkey, though the projected war did not break out until 10 years later, in 1736, and lasted three years, during which time the Turks recovered Nissa from the Austrians, captured Orsova, won the battle of Crocyka, and compelled peace. By the Treaty of Belgradè (18–23 Sept. 1739) Austria ceded Orsova, Belgrade and all territories gained by the Treaty of Passarowitz (1718), viz., a strip of Serbia and the Banat of Temesvar, while Russia ceded all her conquests except Azov, which was to be dismantled. A treaty of neutrality was concluded between Turkey and Russia in 1748, but in 1767 Russian agents began to stir up the Greeks, Montenegrins and Bosnians against the Turks, who declared war against Russia in October 1768. The struggle raged for nearly six years; the Russians defeated the Turks and occupied Moldavia and Bucharest, but their initial successes were checked by a Turkish victory and a revolt among the Don Cossacks, so that the tsar solicited the mediation of Austria in 1773. By the peace of Kutchuk Kainardji (July 1774) the Tartars were brought under Russian influence; Russia gained an embassy at Constantinople and secured privileges for the Christians; she exacted promises of better government for the principalities, the right of free commercial navigation in Turkish waters, and gained a firm footing on the northern shores of the Black Sea. Austria obtained Bukovina from Turkey — after forcible occupation — in 1775. Yielding to Russian demands, Turkey ceded the Crimea and Kuban to Russia in 1784, and on 10 Aug. 1787 Turkey once more declared war on Russia, which was followed by Austria declaring war on Turkey 9 Feb. 1788. The Russian troops gained several successes, but the campaign proved unfavorable to the Austrians. Their united forces defeated the Turks at the battle of Fokshani (31 July 1789), and at Rimnicu (22 Sept. 1789); the Turks lost Belgrade, Bucharest, Bender and Akerman. Austria made peace 4 Aug. 1791 and took Orsova; Russia continued until 9 Jan. 1792, when she also made peace in order to devote her strength to the war with Poland. While Europe was ablaze with the Napoleonic wars, Russia and Turkey again came to grips in November 1806. England joined Russia and a British fleet forced the passage of the Dardanelles. In 1808 Russia submitted peace terms to the Porte; they were rejected, and another war began in April 1809. The Russians seized Tultcha and Ismail on the Danube and drove the Turks from Rustchuk, which the Russians set on fire in 1811. A Turkish army in Wallachia surrendered. Russia made peace on 28 May 1812 on terms favorable to her enemy in order to repel the threatened invasion of her own dominions by Napoleon. Turkey lost part of Bessarabia and Moldavia, and acknowledged the principality of Serbia.

After the fall of Napoleon the Greek struggle for independence from Turkey claimed the attention of the European powers. On 20 Oct. 1827 the combined fleets of England, France and Russia inflicting a crushing defeat on the Turkish navy in the Bay of Navarino and made Greece a free country. On 26 April 1828 Russia again declared war on Turkey, crossed the

Danube, captured Varna and Silistria, and forced peace by the Treaty of Adrianople (14 Sept. 1829), by which the independence of Greece was recognized by Turkey and Russia gained some islands and a strip of territory in Asia Minor, besides securing free navigation of the Black Sea for commerce. Wallachia and Moldavia (now Rumania) received separate administrations, Serbia was recognized as a vassal state, and Turkey was mulcted in an indemnity of 10,000,000 ducats. Russia became possessed of the whole eastern coast of the Black Sea, with the free navigation of the straits, and obtained complete command of the chief mouths of the Danube. She also secured the protectorship of the Greek Church throughout the whole of Turkey. The Anglo-French-Russian coalition against the Ottoman Empire produced unfortunate results. While from the European point of view it was good and proper that the grip of the Turk should be relaxed from Christian territories in Europe, the repeated interventions of the powers in Turkish internal affairs had bred suspicions and rivalries among those powers themselves. Russian designs on Constantinople aroused the smoldering hostility of her allies of Navarino and produced the Crimean War (q.v.), which was strictly a Russo-Turkish War. The gradual dismemberment of the Turkish Empire in Europe proceeded over a period of 350 years and reached its climax in the Balkan Wars (q.v.) of 1912–13. Before 1875 Turkey had lost Transylvania, Azov, Moldavia, Wallachia, Serbia, Greece, Bessarabia, Bukovina and the Crimea, besides Asiatic territories and active control of Egypt, retaining in some cases a shadowy suzerainty.

The Russo-Turkish War of 1877–78 directly originated from a revolt that broke out in Herzegovina during July 1875 against Turkish oppression, though in reality it was but a continuation of the age-long quarrel between the two countries — their 10th war. It was the most determined attempt hitherto made by Russia to force a solution of the Eastern Question — "the nightmare of Europe." The insurrection was secretly supported by Serbia and Montenegro and encouraged by Russian agents. Severe conflicts between Christians and Mohammedans also broke out in Bosnia, and thousands of refugees fled to the Austrian frontier. The rapacity of Turkish tax collectors was mainly responsible for the outbreak. To Austria, any disturbance on her borders threatening the *status quo* was always a serious embarrassment. On behalf of Russia, Germany and Austria, Count Andassy (q.v.) drew up a scheme of reforms to be submitted to the Porte, insisting upon the abolition of tax-farming; the application of the direct revenue of Bosnia and Herzegovina for the benefit of those provinces; the establishment of religious liberty; the creation of a commission composed equally of Mohammedans and Christians to supervise the reforms, and the amelioration of agrarian conditions by the sale of land on easy terms to the peasants. Though accepted by the Porte, the Andrassy note failed of its purpose because it did not provide for supervision by the three emperors over the execution of the reforms. The insurgents refused to lay down their arms; England and Austria attempted pacification, but the disaffection only spread. Diplomatic conferences were held with a view to avoid intervention when the crisis suddenly became aggravated by the murder of the German and French consuls in Salonica by a Turkish mob (6 May 1876). The Berlin Memorandum of 13 May insisted on the reforms and a two months' armistice; Italy and France accepted the memorandum, but England withheld consent and despatched a fleet to Besika Bay. The other powers also sent warships and compelled Turkey to punish the murderers of the consuls, but compensation could not be enforced owing to the chaotic condition of the Turkish finances. Midhat Pasha deposed the Sultan Abdul Aziz and placed Murad on the throne. Constitutional reforms were promised and a peaceful settlement seemed within reach. Meanwhile, an insurrection had broken out in Bulgaria and was suppressed by the Turks with unspeakable barbarity. The ruthless massacre of some 12,000 Bulgarians aroused a thrill of horror in Europe and inflamed popular passion. On 30 June Serbia declared war on Turkey; Montenegro followed suit on 2 July. Supported by Germany, Austria and Russia drew up plans for the partition of Turkey. The Serbians were defeated when Russia intervened with an ultimatum demanding effective protection for the Christians and a two months' armistice. Abdul Hamid II, who had meanwhile succeeded Murad V (deposed and exiled), accepted the Russian terms, but at the same time energetically prepared for the coming struggle. To allay British anxiety, the Tsar Alexander II disclaimed all desire for territorial aggrandizement, but stated clearly that he would act alone if the reforms were not carried out. Lord Derby proposed a conference of the Powers at Constantinople. Warlike preparations were hurried on all sides; England threatened to occupy Gallipoli and Constantinople if Russia occupied Bulgaria. A conference of the Powers assembled at Constantinople 12 Dec. 1876, with the twofold object of preserving the integrity of Turkey and of pressing the desired reforms. The demands for a foreign commission and a European control over the appointment of governors were entirely rejected, and the conference broke up in failure.

On 31 Jan. 1877 Russia asked the Powers what they now intended to do. England suggested a year's probation, and by her advice the sultan made peace with Serbia, 28 Feb. 1877. At the instance of Russia the London Protocol was signed 31 March and presented to the Porte, once more demanding the reforms and also peace with Montenegro, which still continued the war. The Protocol was rejected by Turkey, and on 24 April Russia declared war, England declared strict neutrality so long as the Suez Canal was not interfered with, Constantinople not occupied, and the Bosphorus and Dardanelles left untouched. The Russian army consisted of 164,000 men in the Caucasus, 56,000 on the coasts of the Black Sea, and 136,000 in Bessarabia. The army intended for the Danubian territories rose by 15 June to 216,000 men. The navy was composed of 13 ironclads, three frigates and a dozen monitors. The Turkish army of the Danube, under Abdul Kerim Pasha, was composed of about 160,000

men; Osman Pasha had 35,000 at Widin, and some 100,000 were spread among the fortresses of Shumla, Rustchuk, Silistria and Varna. Some weak divisions lay in the Dobrudja and the rest at Tirnova and Shipka. Reserves were being concentrated at Sofia and Constantinople; 15,000 stood on the Serbian frontier and in Bosnia-Herzegovina; 25,000 facing Montenegro; and other troops in Albania and Macedonia. The Danube flotilla consisted of four armored corvettes, nine monitors, five armored gunboats and five other gunboats. The Russians under the Grand Duke Nicholas crossed the Pruth in April, and the Danube in June, and soon put the Turkish flotilla out of action. A convention signed 16 April 1877 between Russia and Rumania (the latter a vassal of Turkey) gave the Russians free passage and use of Rumanian railways and telegraphs. The first fighting occurred in Asia, where the Russians under Loris Melikov advanced on Batum, Kars and Bayazid, meeting with fierce resistance and several defeats. In Bulgaria they were more successful, where Gourko seized the Shipka Pass, crossed the Balkans, and threatened Adrianople; other armies marched on Rustchuk and one took Nicopolis. Russian successes now caused anxiety in England; a squadron was sent to Besika Bay and Malta was reinforced. Osman Pasha took Plevna (q.v.) and strongly fortified it. Here, with a force of about 50,000 men he repulsed all attacks of the Russians and Rumanians for three months, when he was compelled to surrender, 10 Dec. 1877. The whole country, from the Balkans to the Danube, gradually fell into Russian hands. In Armenia the Russians had retrieved their early failures and taken Kars. The Montenegrins captured Dulcigno, Antivari and Niksitch; Crete rose in rebellion and demanded union with Greece; the insurrection in Bosnia-Herzegovina continued, Thessaly and Epirus were in revolt, and the Serbians again rose in arms. The sultan's efforts to enlist European mediation met with no response; he then appealed to Queen Victoria, who obtained an assurance from the tsar that he would listen to a direct appeal from Turkey. Accordingly, Russo-Turkish plenipotentiaries met at Kasanlik on 19 Jan. 1878. An armistice was granted on 31 January and peace preliminaries signed. England's attitude had meanwhile verged on the fringe of war with Russia; it was known that she would forcibly oppose a Russian occupation of Constantinople. A British fleet passed through the Dardanelles and anchored a few miles below Seraglio Point. The Treaty of San Stefano between Russia and Turkey was signed 3 March 1878. By its provisions Montenegro, Serbia and Rumania were made independent; Russia took Bessarabia and gave Rumania the lower Dobrudja (Turkish), as compensation; Bulgaria received an accretion of territory and was created an autonomous principality tributary to Turkey; the reform program of 1876 was to be carried out with regard to Bosnia-Herzegovina; Crete and the remaining Christian provinces were to have improved administrations, and the Armenians were to be protected against the Kurds. Also the Dardanelles and the Bosphorus were to be open to the merchant ships of all nations in peace and war times. So far, the terms of the treaty were acceptable both to England and Austria, but those two powers firmly opposed the other conditions laid upon the Porte, namely, an indemnity 1,400,000,000 rubles ($740,147,450), coupled with the stipulation that Ardahan, Kars, Batum, Bayazid and the territory between the Russian frontier and the Soghanly Mountains be ceded to Russia in consideration of 1,100,000,000 rubles ($581,544,425) being remitted from the indemnity, owing to Turkey's weak finanical position. England demanded that every article of the treaty should be laid before a congress to be held in Berlin. Russia's refusal made war imminent. Lord Beaconsfield ordered the mobilization of the British army and navy and summoned troops from India; Austria voted a war fund and prepared to occupy Bosnia. After some diplomatic conversations Russia decided to accept the British and Austrian demands, and the Berlin Congress (q.v.) met on 13 June 1878. Nine days earlier Lord Beaconsfield had concluded a convention with Turkey engaging to aid against future aggressions by Russia, if the sultan would carry out the necessary reforms. Great Britain received Cyprus to be held by her until Russia restored her Armenian conquests. The Congress tore up the treaty of San Stefano, substituting for it the famous treaty of Berlin signed 13 July 1878. Montenegro, Serbia and Rumania were confirmed in their independence; the first-named received the ports of Dulcigno and Antivari; Serbia and Rumania received accessions of territory and Bulgaria north of the Balkans was made autonomous. Bosnia and Herzegovina were handed over to Austria to be administered until such time as Turkey would be able to assume that task on more enlightened principles. Russia retained Batum and Kars in Asia, but restored Bayazid; she also acquired Bessarabia and a part of Armenia. England secured Cyprus, and France a lien on Tunis. Pecuniary indemnities were excluded altogether. The results of the congress and the treaty were not calculated to increase friendly relations between the powers. Each of the contracting parties, as well as the beneficiaries, was left with a national or territorial grievance. Turkey had been despoiled by friends and enemies alike; Russia had been checked, Greece ignored and the aspirations of the Balkan principalities unrealized. The elaborate stipulations for the protection of Christian subjects of Turkey were never observed. See BALKAN LEAGUE; BALKAN WARS; BOSNIA; BULGARIA; RUMANIA; RUSSIA; SERBIA; TURKEY; WAR, EUROPEAN: RUSSO-TURKISH CAMPAIGN; AUSTRIA AND THE WAR.

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RUST, ferric oxide, formed by the gradual oxidation of iron when exposed to the air. Carbon dioxide is, if not a necessary factor, a powerful accelerant of the action. To remove rust the usual mode is to rub the object with a piece of oiled rag or emery paper. More rapid and more satisfactory results are secured by using very pure petroleum, and wiping with a hempen or woolen rag. To prevent rust, dip iron or steel articles in a mixture of equal parts of carbolic acid and olive-oil, rubbing the surface with a rag. Others rub the metal with a mercurial ointment, leaving a thin layer of mercury over the entire surface. If iron be dipped in a solution of carbonate, chromate or bichromate of potash or soda in water the surface will be protected by a tenacious film of oxide against rust for a long time, and objects can be protected for any period by burying in quicklime. Rubbing the surface with plumbago has a similar effect.

RUSTCHUK, roos'chook, Bulgaria, a town on the right bank of the Danube, at the confluence of the Lom, opposite Giurgevo, 42 miles southwest of Bucharest. It has some woolen, silk and other manufactures and considerable trade. It was of strategic importance owing to its position on the old Turkish frontier, and was almost destroyed by the Russian bombardment in the War of 1877–78.

RUSTON, La., city and parish-seat of Lincoln Parish, 165 miles northwest of Baton Rouge, on the Chicago, Rock Island and Pacific, and the Vicksburg, Shreveport and Pacific railroads. There are cotton and lumber interests, and the Louisiana Industrial Institute is located here. It is also the home of the Louisiana Chatauqua, and has a high school, orphanage and a fine post office. Pop. 3,389.

RUSTS. See FUNGI.

RUTABAGA. See TURNIP.

RUTACEÆ, roo-tā'sē-ē, a widely dispersed family of polypetalous plants with about 950 species, most frequent in warm regions, and especially so in South Africa and Australia. They are generally shrubs or trees, bearing leaves in various forms, without stipules, dotted with glands and often heavy-scented. The four- or five-parted flowers are often in axillary cymes and the fruits are various, being most conspicuous in the genus *Citrus,* which produces the orange and lemon. Two American genera are *Ptelea* (hop-tree), and *Zanthoxylum,* or prickly ash. The latter is represented by small trees, prickly, with a powerfully stimulative and tonic bark. The common rue is a member of the typical genus *Ruta.*

RUTGERS, Henry, American philanthropist; b. New York, 7 Oct. 1745; d. there, 17 Feb. 1830. He was graduated from Columbia in 1766; served as captain in the Revolutionary War and later as colonel of New York militia, and entered the legislature in 1784 to which he was frequently re-elected. He was a member of the board of regents of the New York University from 1802 to 1826. His gifts to public purposes were many, the chief being $5,000 to Queen's College of New Jersey, which thereupon took the name of Rutgers.

RUTGERS COLLEGE, located at New Brunswick, N. J. It was chartered in 1766 under the name of Queen's College; the charter was slightly altered in 1770. In 1771 the college was located at New Brunswick. During the Revolutionary War, when the British army occupied New Brunswick, the college exercises were continued at Millstone and at North Branch. The present site of the college was secured in 1808, and in 1825 a generous donation was received from Col. Henry Rutgers, and the name changed to Rutgers College in his honor. A theological school was at first affiliated with the college, but has since become an independent institution. There is a preparatory school, established at the same time with the college. The organization of the collegiate department now includes two schools, the classical school and the Rutgers Scientific School. In 1864, the legislature designated "The trustees of Rutgers College in New Jersey maintaining the Rutgers Scientific School" as the State College of Agriculture and Mechanic Arts; the Scientific School thus became the beneficiary of the Congressional land grant of 1862, and of the appropriation law of 1890. In the classical school the work of the freshman and sophomore years is required, while two courses are elective for junior and senior years; the degrees of A.B. and B.L. are conferred. In the Scientific School the studies of the freshman year are the same for all courses; at the end of that year the student elects one of the six courses offered, certain subjects, such as English, history, political economy, etc., being required in all. The six courses are agriculture, civil engineering, and mechanics, chemistry, electricity, biology, clay-working and ceramics. All courses lead to the degree of B.S. There is also a special two years' course in ceramics. Military drill is required of all students in the Scientific School. The school conducts a university extension department, and the State agricultural experiment station is connected with it. The Scientific School is under control of the college board of trustees of which the governor, the chief justice and the attorney-general are members ex officio; and is also under the super-

vision of a State board of visitors appointed by the governor. The college farm contains 100 acres and is well equipped with modern apparatus. The buildings on the campus include Queen's College, Fine Arts Building, Van Nest Hall, Geological Hall, Kirkpatrick Chapel and Library, State Laboratory, Ceramics Building, Winants' Hall (dormitory) and the Ballantine Gymnasium. The library in 1922 contained some 120,000 volumes; the students in the collegiate department numbered 833 and the faculty, 108, besides special teachers. The college also conducts a summer school and extension lectures and during the past 20 years has more than doubled its enrolment.

RUTGERS SCIENTIFIC SCHOOL, a department of Rutgers College, New Brunswick, N. J., designated by law as the New Jersey State College of Agriculture and Mechanic Arts. See RUTGERS COLLEGE.

RUTH, Book of. The Book of Ruth is one of "the five Megilloth" (Rolls) which constitute a portion of the third division in the Hebrew Canon, "the Writings." The book is a story of the time of the Judges, with the Moabitess Ruth as the heroine, narrated with simplicity and charm. It was evidently written much later than the time of which it treats. That time belongs to the past, i, 1, as also that of King David, iv, 17. The custom described in iv, 7 is so fully obsolete as to need explanation. The language is for the most part good Hebrew, but words found here and there indicate lateness; this is not confined to iv, 18–22, probably a later addition. Its place in "the Writings" rather than in "the Prophets" also indicates late composition. These considerations make it probable that the time of writing was after the exile. The purpose of the book, as will be noted, doubtless limits the time more definitely.

Two features are specially prominent in the treatment of the book: the descent of David from a Moabitess, and the inculcation of the duty of the nearest of kin to marry the widow of a man who died without a male child. The purpose doubtless included both elements. The second has no specific indication of time. The custom here described is broader than that of Deuteronomy xxv, 5–10, where the duty is limited to a brother of the deceased. The first feature, however, affords a more definite suggestion of time. Deuteronomy xxiii, 3 forbids unto the tenth generation the entrance of the descendant of a Moabitess into the assembly of Yahweh. The activities of Ezra and Nehemiah were directed especially against marriage with foreign wives, Ezra ix–x, Nehemiah xiii, 23–29. It must be remembered that the book makes frequent mention of the fact that Ruth is a Moabitess, and in ii, 10 she calls herself a foreigner. The attitude of the book is thus in direct opposition to the regulations which found their fullest expression in the time of Ezra and Nehemiah, the middle of the 5th century. The most probable time for the book, therefore, is not long after the period of Ezra and Nehemiah, the book, at least partly, being designed as a protest against the attitude which they represented. This book is, therefore, one of the evidences that along with the narrowness of the dominant postexilic view there persisted a broader conception of Judaism, which, in some of its other phases, appears also in the books of Jonah and Proverbs, and elsewhere.

The treatment of the author has an idealizing element. His presentation of the peaceful village life of the time of the Judges is in marked contrast with the turbulence of the period as reflected in the Book of Judges. The probability of a historical basis for the story, however, is indicated by the connection of David with Moab suggested in 1 Samuel xxii, 3–4. The tradition on which the book is based was doubtless preserved in the family of David.

Of suggested later additions the only one that seems probable is iv, 18–22. The decisive reason here is not the abundance of marks of lateness in the language of these verses, but rather the fact that here Obed is treated as the son of Boaz; in the book itself (iv, 5, 10), he is regarded as legally the son of Mahlon, according to the ancient custom. The addition of these verses was evidently prompted by a genealogical interest.

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RUTHENES, RUTHENIANS, RUSSNIAKS, or **LITTLE RUSSIANS,** are Slavonic tribes inhabiting Eastern Galicia, Bukowina and the neighboring districts of Hungary. They are part of the "Little Russians" who dwell in the Ukraine. The number of Austrian Ruthenes amounts to about 3,500,000; according to some authorities there are over 4,000,000, of whom 500,000 are settled in the northeast provinces of Hungary, 300,000 in the northwest of Bukowina, and the remainder in Galicia. The name "Ruthene" is merely the German and Austro-Hungarian title for "Ukrainian"; by whatever name they are called, they are one people, and form a racially compact mass of some 30,000,000 souls, extending from the Dnieper to the Carpathians into Hungary. Russia regards the Little Russians as an integral part of the Great Russian family and their language as a Russian dialect. Austria, on the other hand, encouraged the Ruthenes to regard themselves as a separate Slav race and their language as a distinct Slav idiom. As Rambaud has pointed out, some writers have been anxious to establish the existence of a profound difference between the Great Russians and their two neighbors, the White and the Little Russians. The dialectical differences between the idioms of these three families are easily traceable to historical and literary influences. The Little Russian dialect is spoken by over 26 per cent of Russian-speaking races.

The Carpathian Ruthenes are divided into Boiki, Lemki, Gutsuli and Ugorski Ruthenes. Of these the Boiki inhabit the central portion of the northeastern slope of the Carpathians. They wear long hair and are sometimes clean-shaven — in marked contrast to the Slavs of Russia proper. Their chief occupation is cattle-breeding. The Lemki live between the northern frontier of the Boiki as far as the river Poprad. They are much under the influence of the Slovaks and their dress differs considerably from that of the other Ruthene tribes. Their hair is cropped short and their faces are always clean-shaven. The Gutsuli inhabit the southwestern region of East Galicia, West Bukowina, and southeastern Ugorsakya Rus, forming in reality a single people divided into three by political boundaries. Dwelling in remote mountain districts they alone among the Austro-Hungarian Ruthenes escaped serfdom and developed among themselves a comparatively high degree of well-being. Their manner of life has fostered among them the love of arms and a fondness for finery in dress. To a greater degree the Gutsuli have preserved their ancient heritage in dress and habits than other Ruthene tribes. The Ruthenes of the Galician plain reproduce in their dress and buildings the more typical features of life in the neighboring Volhynia and Podolia provinces of Russia, whereas in Bukowina the obtrusion of Rumanian influence is marked. The Ruthenian peasants of Eastern Galicia live in wretched circumstances; they are mere farm-hands tied to the soil by a miserable pittance from the Polish gentry, who own much of the land and hold practically all administrative posts. The bulk of the Ruthenes belong to the Uniate Church, which means that they acknowledge the Pope, but retain the outward forms of the Greek Church and have married priests. Despite the published official statistics, it is the Ruthenes and not the Poles who are in the majority within Galicia. Under the new franchise law of 1907 the Poles obtained 78 seats in the new Parliament, while the Ruthenes were given 28 seats. By a compromise effected in February 1914 the Ruthenes were guaranteed a representation of 27 per cent in the legislature. Yet the Ruthenes were in many respects better off under Austrian than Russian rule. They were permitted their own schools (about 2,500), social and political clubs and their own language and literature. Owing to this fact much of the Ukrainian propaganda in Russia had been directed from Lemberg during recent years. The University of Lemberg, established by the Emperor Joseph II for the Ruthenians alone, was appropriated by the Poles. Protests led to wholesale imprisonment, though latterly the number of Ruthenian professors had been increased. According to statements by the Ruthenian National Union (New York) the Ruthenes "felt in recent years that there was hope for their cause within the Austrian monarchy." The policy of both Russia and Austria-Hungary had long been directed toward keeping the closely-related Ruthenians and Ukrainians apart. The collapse of those empires in the course of the war brought about the formation of a new nation, the Ukraine, which included the Ruthenian section of Galicia. See UKRAINIANS.

RUTHENIUM, a metal of the platinum group. It has the atomic weight 101.7, and the symbol Ru. Some specimens of platinum ore contain from 3 to 6 per cent of ruthenium. It is a whitish-gray metal, having a specific gravity of 11 to 11.4 and after fusion of 12.063; is very fusible, more so than any other metal except osmium; is scarcely attacked by nitro-muriatic acid, but is more easily oxidized by fusion with nitre, chlorate of potassium, etc. than platinum. Ruthenium forms a series of salts which are analogous to those of platinum.

RUTHERFORD, rŭth'ẽr-fẽrd, N. J., borough in Bergen County, on the Erie Railroad, about nine miles from New York and seven miles southeast of Paterson. It is a residential place, occupied chiefly by business men from New York. Several electric lines connect the borough with many of the cities and boroughs in the vicinity. Its principal public buildings are churches, schools and a public library. Pop. (1920) 9,497.

RUTHERFORD, Sir Ernest, Canadian physicist: b. Nelson, New Zealand, in 1871. He was educated at Nelson College and the University of New Zealand, and at Trinity College, Cambridge, England. He was awarded the 1851 Exhibition Science Scholarship in 1895 and from that time until 1898 worked at research in the Cavendish Laboratory, Cambridge, in the latter year being appointed professor of physics in McGill University, Montreal. In 1903 he was elected a Fellow of the Royal Society; in 1904 delivered the Bakerian lecture before the Royal Society and was awarded the Rumford Medal; in 1905 delivered the Silliman lectures at Yale University. Since 1907 he has been Langworthy professor and director of the physical laboratories of Manchester University, England. In 1908 he was awarded the Nobel prize for chemistry and in 1914 he was knighted. He has published 'Radioactivity' (Cambridge University Press 1904); 'Radioactive Substances and their Radiations' (1913).

RUTHERFORD, Lewis Morris, American astronomer: b. Morrisania, N. Y., 25 Nov. 1816; d. Tranquility, N. J., 30 May 1892. He was graduated from Williams College in 1834, admitted to the bar in 1837, and practised law in New York until 1849. He then devoted himself to the study of science, making valuable investigations in the departments of astronomical photography and spectral analysis. He made several instruments for use in his laboratory, among which were an abject glass, a micrometer for measuring astronomical photographs and a dividing engine (q.v.) of great value. He was a trustee of Columbia University from 1858–84, when he resigned and presented his astronomical instruments to that institution where they are now mounted, and was also one of the original members of the Academy of Science.

RUTHVEN, ruth'vĕn (Scotch rĭv'ĕn), **Raid of.** See GOWRIE CONSPIRACY.

RUTILE, titanium oxide TiO_2 in tetragonal form, the chief source of titanium; also used as a gem and for coloring matter for porcelain, artificial teeth, etc. Mined in Virginia.

RUTLAND, Mass., village and township in Worcester County, 75 miles west of Boston,

on the Boston and Maine Railroad. It was settled in 1716, and became a town in 1722. After the surrender at Saratoga, part of Burgoyne's troops were quartered here in 1777–78; and the town was the home of Rufus Putnam in 1781–87. The State hospital for tubercular patients is located here, as are the prison camp and hospital. There are several private *sanatoria.* Pop. 1,743.

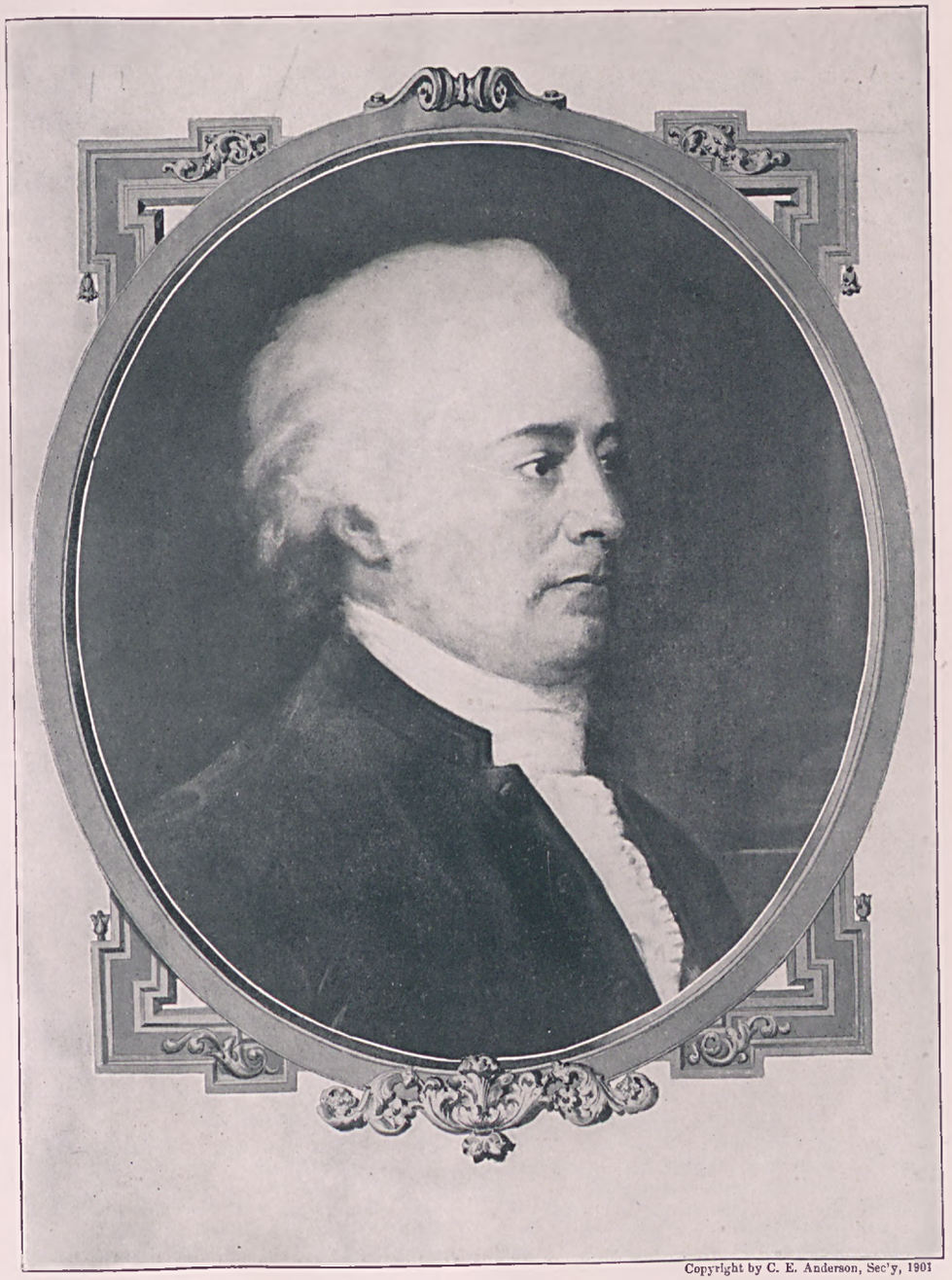
RUTLAND, Vt., city, county-seat of Rutland County; on the Otter and East creeks, and on the Rutland and Burlington and the Delaware and Hudson railroads; about 56 miles south-southwest of Montpelier, the State capital, and about 62 miles south by east of Burlington. It was settled in 1770 by persons from the East having been incorporated in 1761, by New Hampshire. It was chartered as a city in 1892. Rutland was in the battle region of the War of the Revolution. Two forts were erected here, as it was situated on the Great Northern Military Road. In 1781 it was made the capital of the county, and from 1784 to 1804 it was one of the State capitals. The old boundaries included an area of 26,000 acres with the Green Mountains on the east and the Taconic Range on the west. In 1886 the towns of Proctor and West Rutland were set off from Rutland. The new towns have independent governments, but all are united commercially. Rutland is in an agricultural region, but is well known for its extensive marble quarries and industries connected with the shipment of marble. Iron ore, fire-clay and slate are found in the vicinity. The marble works have been of considerable importance since 1830. The quarries are now in the new towns, but the industries continue as formerly. The chief industrial establishments of Rutland are manufactories, in which are made machinery for quarrying, and channeling marble, machine shops, engine and boiler works, Howe's scale factory, sash, door and blind factories, butter and cheese factory machinery, lumber and brick yards, sugar evaporator works, creameries and flour and grist mills. The principal buildings are Memorial Hall, built in honor of the soldiers of Rutland who fell in the Civil War, Baxter Memorial Hall, the government building, the county courthouse, city-hall, house of correction, opera house, bank buildings, churches and schools. The material for the construction of Memorial Hall was donated by the marble quarry companies and the cost additional was $60,000. The educational institutions are a high school, Saint Joseph's Academy, public and parish graded schools, the Rutland Free Library and Baxter Memorial Library. The city is well equipped with banks, newspapers, and wholesale and retail business establishments. Pop. (1920) 14,954. Consult Hemingway, 'Gazetteer of Vermont'; Moore, 'Churches of Rutland, Vermont.'

RUTLEDGE, rŭt'lĕj, **Edward,** American soldier and legislator: b. Charleston, S. C., 23 Nov. 1749; d. there, 23 Jan. 1800. He was admitted to the bar in 1773, established a practice in Charleston and in 1774 was elected to the Continental Congress. He was a signer of the Declaration of Independence in 1776 and a member of the first board of war. In this capacity he was delegated with John Adams and Benjamin Franklin to confer with Lord Howe on the subject of a reconciliation, but declined to treat with him excepting on the basis of American independence. As lieutenant-colonel of the Charleston artillery he assisted in expelling the British from Port Royal in 1779 and in 1780 was captured. After his release a year later he resided in Philadelphia, was a member of the Jacksonborough legislature in 1782, and after the war returned to Charleston where he resumed his law practice. He was for many years a member of the State legislature, was elected United States Senator in 1794 and governor of South Carolina in 1798. Consult McCrady, 'South Carolina in the Revolution' (1901–02).

RUTLEDGE, John, American jurist: brother of Edward Rutledge (q.v.): b. Charleston, S. C., 1739; d. there, 23 July 1800. He studied law in England, returned to Charleston in 1761 and there established himself in law practice. From the outset of his career he was an ardent opponent of the oppressive laws governing the colonies and as delegate to the congress at New York in 1765 openly advocated the united resistance of the colonies. In 1774 he was a member of the South Carolina convention which carried a resolution that South Carolina should be represented in the Continental Congress. He served as delegate to the Congress of 1775 and in 1776 was chairman of the committee that framed the South Carolina constitution, was elected president of the State government and commander-in-chief of the militia. When the British forces arrived off Cape Fear he fortified Charleston and prevented the invasion of the State. He resigned his office in 1778 through dissatisfaction with changes in the constitution, but was recalled in the following year and invested with dictatorial authority. He at once set about preparations for defense and held the city until 1780. He then joined the forces of General Greene and upon the recapture of Charleston resumed his duties as governor. In 1782 he was elected to the Continental Congress, was re-elected in 1783 and in 1784 became chancellor of South Carolina. He was a member of the convention which framed the Constitution of the United States in 1787. He became chief justice of his State in 1791 and in 1795 was appointed chief justice of the Supreme Court. His mind failed in the following year and he held no further public office.

RUTTAN, Robert Fulford, Canadian chemist: b. Newburgh, Ontario, 1856. He was educated at the universities of Toronto, McGill and Berlin. From 1887 he was connected with the faculty of McGill University, occupying the chair of organic and biological chemistry there in 1902–12, since when he has been director of the department of chemistry. He has made many important contributions to the knowledge of medical chemistry. Author of 'Artificial Alkaloids'; 'Glycol Fats'; 'Physical and Chemical Constants of Margaric Palmitic and Stearic Acids', etc.

RUWENZORI, roo-wĕn-zō'rē, a group of mountains in Africa, north of the equator, discovered by Stanley in 1888, in his great journey from the west to the east coast, when he rescued Emin Pasha. It is a chain of heights about 16,000 feet in elevation, is clad with snow and



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JOHN RUTLEDGE

Chief Justice of the United States Supreme Court, 1795

traversed by large glaciers. It lies about 200 miles to the westward of the Victoria Nyanza and between the Albert Nyanza and Albert Edward Nyanza. The river Semliki, which connects the two lakes, flows in a valley near the range. The snow-line is about 13,000 feet above sea-level. These mountains are sometimes identified with the Mountains of the Moon, spoken of by ancient writers.

RUY BLAS, by Victor Hugo, has held the stage better than any other of his dramas and has been popular in America also in the adaptation 'Don César de Bazan.' Here Hugo's dramatic theory of contrast of grave and gay, rapid alternation of tragic and grotesque, is pushed to its utmost verge. The scene is Madrid; the time 1699. Don Salluste de Bazan, scorned by Maria de Neubourg, second wife of the do-nothing King, Charles II, plots revenge. Failing to enlist the aid of his scapegrace but chivalrous cousin, Don César, he introduces his valet, Ruy Blas, to the court as his kinsman. Ruy Blas loves the queen and through her sympathetic interest gains official preferment which he uses for political and fiscal reform. The long speech, 101 lines, in which he contrasts the sordid struggle for sinecures in a decaying monarchy with the glories of Charles V ranks among the most brilliant tirades of the French drama. The queen and Ruy Blas are betrayed into a compromising situation by Don Salluste, who, when Don César threatens to balk his revenge, ruthlessly sacrifices his cousin to his injured vanity. Ruy Blas kills Don Salluste and then himself, consoled that his death has extorted from the queen an admission that love has overcome all prejudice of rank or station. This play, which Hugo says he began to write on 4 July 1838, has, except for the dénouement, constant and perplexing likeness to Bulwer's 'Lady of Lyons,' first acted 14 Feb. 1838. The idea of a valet set by a scorned lover to woo a fine lady had been turned to dramatic account in Molière's 'Précieuses ridicules'. Hugo certainly used Latouche's 'La Reine d'Espagne' (1831). In his very inaccurate 'V. Hugo raconté par un temoin de sa vie' he notes as sources the 'Memoirs' of Madame d'Aulnoy (1690), 'Solo Madrid es corte' (1675) and Vayrac's 'État présent d'Espagne' (1718). How carelessly he used all these is shown in detail by Morel-Fatio, 'Études sur l'Espagne' (Vol. I., pp. 177–244) 'Ruy Blas' is translated in 'Dramatic Works of Victor Hugo' (London 1913) and in 'Dramas by V. Hugo' (Boston 1903). Consult Biré, 'V. Hugo après 1830' (Vol. I, pp. 236–251) and Bruner, 'Studies in V. Hugo's Dramatic Characters' (pp. 32–129, Boston 1908).

BENJAMIN W. WELLS.

RUYSBROECK, rois'brĕk, or **RUSBROEK,** roos'brōk, **Jan van,** Dutch mystic: b. Ruysbroeck, 1293; d. Grönendal, 1381. He was educated at Brussels and for 26 years was vicar of the church of Sainte Gudule there. In 1353 he renounced the secular priesthood and entered the Augustinian monastery of Grönendal, in the forest of Soignies, where he became prior, lived a contemplative life and wrote his mystical works. His four principal works are 'Die Zierde der geistlichen Hochzeit'; 'Der Spiegel der Seligkeit'; 'Von dem funkelnden Stein'; and 'Samuel.' They were originally written in Dutch and are regarded by his countrymen as among the best prose of the Netherlands during the Middle Ages. Translations were made into German, French and Latin. The four works cited were edited by Arnswaldt (1848); no collected edition has been made embracing his other works, which, however, are mainly restatements of the main features of the foregoing. Consult Engelhardt, 'Richard von S. Victor und Johann Ruysbrock' (1838); Ullmann, 'Reformatoren vor der Reformation.'

RUYSBROEK, Willem van (GUILLAUME DE RUBRUQUIS), Franciscan friar and traveler: b. Brabant, about 1215; d. some time after 1293. He was sent by Louis IX of France to Central Asia to bring about an alliance with Sartach, a supposed Christian prince of Kiptohak, then at war with the Saracens. In May 1253 he set out from Constantinople upon his mission with two other Fransican friars and an interpreter; crossed the steppes, now a part of the Russian province of Ekaterinoslav, reached the banks of the Don, and, after many hardships, the camp of Sartach near the Volga. Refused permission to preach Christianity in Tartary, he made his way across the Caucasus into Armenia, Persia and Asia Minor, reaching Tripoli in Syria in August 1255. An account of the countries and peoples visited by these missionaries was written by Ruysbroek and sent to the French king. The best modern translation is that of Michel and Wright in Vol. IV of 'Receuil de voyages et mémoires de la société de Geographie' (1839).

RUYSDAEL, Jacob van. See RUISDAEL.

RUYTER, rī'tĕr (Dutch, roi'tĕr), **Michael Adriaanzoon de,** Dutch admiral: b. Flushing, 24 March 1607; d. Syracuse, Italy, 29 April 1676. He early entered the navy and rose from cabinboy to captain (1635). In 1641 he was placed as rear-admiral in command of a fleet sent to the assistance of the Portuguese, who had thrown off the yoke of Spain, and he was afterward employed against the Barbary corsairs. In the war between the Dutch and English, which was begun in 1652, Ruyter repeatedly distinguished himself, especially in the battle fought in February 1653, near the mouth of the Channel, in which Blake, commanding the English, defeated Tromp and Ruyter, who commanded the Dutch. He became vice-admiral of Holland after the death of Tromp in 1653 and afterward served against the Portuguese, the Swedes and the Algerines. He commanded in the great battle fought in the Downs in June 1666, against Prince Rupert and the Duke of Albemarle, where he was defeated, but in the following year made his memorable expedition up the Thames, when he destroyed Upnor Castle and burned some ships at Sheerness. He was made admiral-in-chief of the Dutch fleet and commanded at the battle of Solebay (Southwold Bay) in 1672, when the Dutch were defeated by the English under the Duke of York; but in the following year gained a victory over the combined English and French fleets. Consult 'Life' by Milne (1897).

RUZSKY, rooz'skĭ, **Nicolas Vladimirovitsch,** Russian general: b. about 1854. He was educated at the Constantine military schools

and at the Nicolas General Staff Academy, served in the Turkish War of 1877–78, and in the Russo-Japanese War was quartermaster-general. At the outbreak of the European War Ruzsky was in command of the Russians Northern Army and conducted the brilliant military operations which led to the capture of Lemburg in September 1914, a feat for which he received honors from both England and France. He was retired because of ill-health in April 1915, but resumed his command in September. He was again relieved of his command in December 1915, although he retained his position in the council of the Empire and the supreme military council. He was again in command of the Northern Army in July 1916–May 1917, and was then relieved to be reinstated by Kerensky 14 Sept. 1917, as commander-in-chief of the Northern Army, taking up the difficult task of re-establishing discipline in the army under the disorganized conditions of the revolution.

RYAN, Abram Joseph, American poet and Roman Catholic clergyman: b. Norfolk, Va., 15 Aug. 1839; d. Louisville, Ky., 22 April 1886. He became a chaplain in the Confederate army shortly after his ordination to the priesthood, and served until the close of the war, afterward engaging in clerical labors in New Orleans, where he edited the *Star*. He subsequently removed to Knoxville, Tenn., and thence to Augusta, Ga., where he established the *Banner of the South*. He was later in charge of a parish in Mobile, Ala., but in 1880 went North where he engaged in lecturing and also supervised the publication of his poems, subsequently returning to the South. His works include 'The Conquered Banner and other Poems' (1880); 'Poems' (1880), etc.

RYAN, Edward George, lawyer and State judge: b. Newcastle House, near Enfield, County Meath, Ireland, 13 Nov. 1810; d. Madison, Wis., 19 Oct. 1880. Edward George was educated at Clongowes Wood College from 1820 to 1827 and removed to New York city in 1830, where he studied law, supporting himself by teaching. Admitted to practice in 1836, he removed in the same year to Chicago, Ill. In 1839 he became the editor, in that city, of the *Tribune*, Democratic in politics, which ended its career in 1841. During a portion of this editorial period he was prosecuting attorney of Cook County. He removed in 1842 to Racine, Wis., and in December 1848 to Milwaukee in the same State. While residing in Racine he was in 1846 a delegate to a convention at Madison, the capital of the then territory, which met to frame a State constitution. As a practitioner in Milwaukee he achieved great renown, especially in criminal cases and notably in 1853 in the impeachment before the State senate of Levi Hubbell, judge of the Second Judicial Circuit. On 7 June 1874 Mr. Ryan stepped from active practice at the bar to the position of chief justice of the Supreme Court. This was by executive appointment. In April 1875 he was elected by the people to the same office for a term to expire in January 1882 but did not survive to finish this term. Although a Democrat of the States' rights school, Mr. Ryan was always loyal to the government of the United States. The «Ryan Address» issued by him in 1862 did much to uphold the hands of the government in its struggle for existence.

RYAN, James, American Roman Catholic bishop: b. Thurles, County Tipperary, Ireland, 1848. He came to the United States when a child, studied for the priesthood at the seminaries of Saint Thomas and Saint Joseph, Bardstown, Ky., was professor at Saint Joseph's and after ordination served on the Kentucky mission for seven years. In 1878 he was appointed to a charge at Wataga, Ill., and afterward was for a time at Danville. He was rector of Ottawa from 1881–88, when he was consecrated bishop of Alton.

RYAN, John Augustine, American sociologist and theologian: b. Vermillion, Dakota County, Minn., 25 May 1869. He received his education in the public schools of Minnesota, at Saint Thomas College and Saint Paul Seminary, Saint Paul, and the Catholic University, Washington, D. C. Dr. Ryan was ordained to the priesthood in 1898 and from 1902 to 1915 held the chair of moral theology at Saint Paul Seminary, Saint Paul, Minn. Since 1915 he has been professor of moral theology and industrial ethics at the Catholic University of America, Washington, D. C. Dr. Ryan is recognized as an authority on social and labor questions, his moderation appealing effectively to all fair-minded persons. He is also very popular as a lecturer; is member of the American Economic Association, the American Association for Labor Legislation, the Minnesota Academy of Social Sciences, etc. His published works are 'A living Wage' (1906); 'The Church and Interest Taking'; 'Social Reform by Legislation'; 'Francisco Ferrer: Criminal Conspirator' (1910); 'Alleged Socialism of the Church Fathers' (1913); with Morris Hillquit, 'Socialism—Promise or Menace' (1914); 'Distributive Justice' (1916); and numerous pamphlets on social questions.

RYAN, Patrick John, American Roman Catholic prelate: b. Cloneyharp, Ireland, 20 Feb. 1831; d. Philadelphia, Pa., 11 Feb. 1911. He studied at the Christian Brothers' school in Thurles and began his classical course at Mr. Naughton's school, parish of Rathmines. Determined to become a missionary in the United States, he entered Carlow College and after receiving sub-deaconship there, came to the diocese of Saint Louis, Mo. He was ordained to the preisthood in 1853, made rector of the cathedral and subsequently appointed pastor of the Church of Saint John the Evangelist and vicar-general of the Saint Louis diocese. In 1868 Father Ryan accompanied Archbishop Kenrick to Rome and while there preached a series of Lenten sermons that elicited great praise. On 14 April 1872, he was consecrated Titular Bishop of Tricomia and coadjutor to Archbishop Kenrick and on 11 Jan. 1894 was elevated to the titular archbishopric of Salamis, being transferred the same year to the archiepiscopal see of Philadelphia. In 1883 he was among the United States prelates chosen to visit Rome in the interest of the Catholic Church in America. He gave two annual inaugural addresses at the State University of Missouri, lectured twice before the representatives of the Missouri legislature and delivered discourses in nearly all the large cities of the United States, notable among these lectures being that on Modern Skepticism. He published 'What Catholics Do Not Believe,' and 'The Causes of Modern Religious Skepticism.' In 1902 President Roosevelt appointed Archbishop Ryan a member of the Indian Commission and he was a member of the Executive Board of Catholic Indian Missions. The archdiocese of Philadelphia, over which he so ably presided, has a Catholic population of about 475,000; more than 500 priests; 240 churches; 117 parochial schools; 5 hospitals and 12 orphanages, besides many benevolent and educational institutions.

RYAN, Thomas Fortune, American capitalist: b. Nelson County, Va., 17 Oct. 1851. He engaged in the drygoods business at Baltimore in 1868, but in 1870 went to New York and entered Wall street, becoming a member of the stock exchange in 1874, when but 23 years old. He was connected with the consolidation of the street railways and lighting systems of New York, Chicago and other cities; was interested in railroad and coal properties in Ohio and West Virginia; and in 1905 he purchased a controlling interest in the Equitable Life Assurance Society of the United States. Upon his retirement in 1908 he was officer or director in more than 30 corporations. He was a supporter of the Democratic party, a liberal contributor to campaign funds, and served as a delegate to National Democratic conventions.

RYAZAN, rē-ä-zän'. See RIAZAN.

RYBINSK, rü'bĕnsk, or **RUBINSK,** Russia, in the government of Yaroslav, 52 miles northwest of Yaroslav, on the Volga, at the confluence of the Rybinsk. As the port of Petrograd, it is one of the most important points of north central Russia. It became a centre of traffic when the three canal systems connecting Petrograd with the Volga were opened. Its enormous business of transshipment and active trade in grain and hemp, during the season, increases the population by nearly 100,000 workers. Permanent pop. about 30,000.

RYDAL, England, a picturesque village in the county of Westmoreland, two miles northwest of Ambleside. It is situated in a narrow gorge formed by the projection of two mountains near Rydal Lake. The lake, only half a mile in area, contains two beautiful islets, is encircled by meadows and dominated by rocky heights which add to the charm and calm beauty of the surroundings, so celebrated in English literature. Rydal Hall is a fine mansion in a park which contains many grand forest trees and a cascade immortalized in verse by Wordsworth, who lived for some years at Town End, near by, the residence also for a time of De Quincey.

RYDBERG, rüd'bĕrg, **Abraham Viktor,** Swedish writer: b. Jönköping, 18 Dec. 1828; d. Stockholm, 21 Sept. 1895. He studied at the University of Lund, and in 1855 entered journalism, contributing to the leading paper of Gothenburg. In 1868 he was sent to an assembly of the church where he was the champion of liberal ideas and from 1870 to 1872 sat in the Riksdag. In 1884 he became professor of the history of civilization at Stockholm. He is the author of 'The Pirate of the Baltic' (1857); 'The Last of the Athenians' (1859), which has been translated into English, German and Danish; 'The Doctrine of Christ According to the Bible' (1862); 'Magic of the Middle Ages' (1864); 'Romish Legends of the Apostles Peter and Paul' (1871), etc. His works include studies in æsthetics, philosophy and psychology, besides poetry and a translation of Goethe's 'Faust,' and he is regarded as one of the foremost Swedish men of letters.

RYDE, rīd, England, a watering-place in the Isle of Wight, on the Spithead shore, seven miles east-northeast of Newport. It is regularly laid out on a sloping site, and is a picturesque, elegant and well patronized summer-resort, having regular and frequent steamboat communication with Portsmouth, Portsea, Southsea, etc. Pop. about 13,000.

RYDELIUS, Andrew, Swedish prelate and scholar: b. Linkoeping, in 1671; d. 1738. He studied under John Bilberg, and became instructor of philosophy and theology at Lund, where later he was appointed bishop. In 1718 he published a 'Course of Philosophy'; his other works include 'Grammatista Philosophans'; 'Sententiæ Philosophiæ Fundamentales'; 'Orationes Academicæ.'

RYDER, Albert Pinkham, American artist: b. New Bedford, Mass., 19 March 1847; d. 28 March 1917. He studied under William E. Marshall and in the art schools of the National Academy of New York. He made a specialty of pastoral landscape and has been styled "the last of the Romancists."

RYDER, William Henry, American Universalist clergyman: b. Provincetown, Mass., 13 July 1822; d. Chicago, Ill., 8 March 1888. He engaged in preaching when but 19 and at 21 became pastor of the First Universalist Society in Concord, N. H. He afterward preached at Nashua for two years and then traveled in the Holy Land. In 1850 he accepted the pastorate of the Universalist Church at Roxbury, Mass., from which he resigned in 1860 to become pastor of Saint Paul's Church, Chicago. At his death he bequeathed more than half a million dollars to various charitable, educational and religious organizations without regard to any difference in creed.

RYDQVIST, John Erik, Swedish author and critic: b. Gothenburg, 20 Oct. 1800; d. 19 Dec. 1877. He abandoned trade in 1820 to study law and ancient languages, and in 1827 received a civil appointment in the central administration. He became known by his literary and critical works, joined the staff of the Royal Library at Stockholm, and in 1843 was appointed chief librarian. The same year he succeeded Berzelius as member of the Swedish Academy. Besides numerous translations of Greek and English works into Swedish, literary and critical essays published in various collections, notably in the 'Heimdal,' a critical review that he conducted from 1828 to 1832, his principal works include 'The Chief Literary Events of Past Ages' (1828); 'The Most Ancient Stage Works of the North' (1836); 'The Civil Service in Sweden' (1838); 'J. Olof Wallin' (1839), a biographical study; 'Travels in Germany, France and Italy' (1838); and 'The Laws of the Swedish Language' (2 vols., 1850–57), a philological work of great value.

RYE, N. Y., a town of Westchester County, on the New York, New Haven and Hartford Railroad, eight miles northeast of New Ro-

chelle. Rye was founded in 1660, and five years later was organized as a town of Connecticut, the border line not being settled until 1700. One of Rye's interesting features is the Jay homestead, where John Jay spent his youth. Port Chester, a manufacturing village, is within the boundaries of Rye, and Rye Beach on Long Island Sound, with its picturesque colony of bungalows, cottages and shacks, is a favorite summer resort for bathing, boating and other recreations. Pop. 5,308.

RYE (*Secale cereale*), a plant of the grass family, and allied to wheat, which yields the fifth most important cereal crop in the United States. It is an erect hardy annual, with slender stiff culms from four to six feet high, flat leaves, and a terminal, compact, somewhat flattened, bearded spike from four to six inches long. The spikelets are usually two-flowered, sessile, compressed, alternate, convex on one side and flat on that next the rachis. The outer glume is keeled and often carries a short awn, while the flowering glume carries a long awn. Each floret has three stamens and two very short styles. The grain is oblong, furrowed on the inside, hairy at the apex and generally free from the flowering glume and palea. The plant is not found wild, but is believed to be indigenous to the country bordering the Black and the Caspian seas. The granules of rye-starch are larger than those of wheat or barley, some being .0016 of an inch in diameter. The form of the larger ones is that of a flattened disc with a depressed centre having cracks on its outer edge. The hilum is central with lines radiating almost to the circumference.

Rye is hardier than wheat and is usually cultivated in cool regions on sandy or light soils, and in the Eastern States on medium loams which have become physically or chemically defective and will not produce satisfactory wheat crops. It will thrive on reclaimed peaty soils. In rotation, rye occupies the same place that wheat would, and, like the latter, prefers a fine firm seed bed. For a grain crop, from one and one-quarter to two bushels per acre are usually sown in the autumn. Judicious rolling and harrowing in spring is often beneficial. The crop is harvested just before it is fully ripe, a good yield varying between 15 and 30 bushels of grain and from one to two tons of straw. The straw is particularly tough and pithy and of little feeding value. It takes a long time to rot in the manure heap when used as litter, unless it is chaffed.

Two types of rye are grown, the common or autumn-sown usually grown for grain, and the spring-sown usually sown in spring, but the former may be sown in spring and the latter in autumn. Midsummer or Saint John's Day rye and giant or Tyrolese rye are spring varieties and good for forage, the latter requiring a rich soil. When grown for forage, as a cover crop, or to be plowed in as green manure, three bushels of rye may be sown per acre at various seasons of the year, the only proviso being that there shall be sufficient moisture and warmth present to insure germination and growth. Green rye is an excellent feed, either for soiling or folding in the spring, being well suited for cows in milk or ewes with lambs. As soon as the ear appears the straw becomes tough and woody, so that stock refuse it, hence it should be grown in small areas and a succession put in. A bushel weighs about 56 pounds and each pound contains on an average about 21,000 kernels.

Feeding Value and Uses.— In northern Europe the grain is largely used for bread-making, but in this country it is chiefly employed either in the manufacture of malt and spirituous liquors, as rye whisky, etc., or as food for stock. Holland's gin and the national Russian drink, kvass, are largely made from rye. The following table shows that rye does not differ materially from wheat in composition, nor are its by-products chemically dissimilar from those of the wheat grain:

Average percentage composition of	Water	Ash	Protein	Crude fibre	Nitrogen-free extract	Ether extract
Rye.....	11.6	1.9	10.6	1.7	72.5	1.7
Rye flour...	13.1	0.7	6.7	0.4	78.3	0.8
Rye bran...	11.6	3.6	14.7	3.5	63.8	2.8
Rye shorts..	9.3	5.9	18.0	5.1	59.9	2.8

The percentage digestibility of rye meal with ruminants is: dry matter 87, protein 84, nitrogen-free extract 92, ether extract 64; while that of rye bran with pigs is: dry matter 67, protein 66, nitrogen-free extract 75, ether extract 58.

In milling the outer portion of the rye kernel constitutes the bran, the second layer the «middlings» or «shorts,» and the inner portion the flour. For stock the whole kernel is ground. Rye flour is somewhat similar to corn meal as a source of protein and energy, but is more expensive. Ground rye and rye bran are fed to cows in Denmark. Not more than three pounds daily should be given, as they are said to have a deleterious effect upon the quality of the butter. Experiments show that for pig feeding rye is of equal value with barley, and that one pound of rye is equal to six pounds of separted milk or 12 pounds of whey; that rye shorts are inferior to rye, the pork from the former being softer and showing more shrinkage. Ground rye may be safely fed to work horses to the extent of eight or 10 pounds daily, together with other feeds, as bran or oats. Owing to the hollow stems of rye holding considerable air, this crop is not making much progress for silage purposes.

Rye straw is longer and more uniform in size than that of other grains and when unbroken it is used for packing pottery, horse collars, mattresses, etc., and in the manufacture of a variety of articles, as paper, hats, bonnets, mats, slippers, toys and fancy articles. For such purposes it often commands a good price.

Diseases.— Ergot (*Claviceps purpura*) is the chief disease and is common on other graminæ. The elongated, curved, brownish or purplish spurs of ergot form on the head in place of a kernel and are sown with the seed unless it is carefully screened. If sown, they germinate and finally send out minute spores which, attaching themselves to the grass, live on it parasitically, send out small thread-like growths which finally reach the ovary, where they displace the rye grain and reproduce the cockspur or resting spore. Ergot should be removed before rye is used as feed; it is dangerous to man and beast.

Statistics.— In 1910 the world's crop of rye was 1,675,898,000 bushels and the production of the United States, 33,039,000 bushels, both being almost the high record. In 1914, the last year in which complete world statistics are available, the production was 1,596,882,000 bushels. In 1914 the leading countries growing rye were Russia, (est.) 800,000,000 bushels; Germany, 410,478,000 bushels; Austro-Hungary, 116,965,000 bushels. The average yield per acre for the first 15 years of the century are Germany 25.6 bushels; Austro-Hungary 18.3 bushels; United States 15.7 bushels; Russia 11.5 bushels. The United States production has been much increased. The Food Administrator's estimate of the crops of 1917 was 56,100,000 bushels, and that 20,000,000 bushels were available for export. The 1922 crop of the United States was estimated by the Department of Agriculture at 95,497,000 bushels compared with 61,675,000 bushels in 1921. North Dakota and Minnesota are the leading rye producing States. The world crop in 1922 was placed at 770,152,000 bushels.

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RYE-GRASS. See GRASSES OF THE UNITED STATES.

RYE-HOUSE PLOT, in English history a conspiracy which took place in the reign of Charles II, and which became famous from the fact that its detection involved the death of Lord William Russell, Lord Essex and Algernon Sidney, who were in no way connected with it. The immediate object of the Rye-house Plot, which was contrived in 1683 among a number of obscure persons belonging to the party of which those celebrated men were among the leaders, was to assassinate the king and his brother, the Duke of York (afterward James II), as they returned from the Newmarket races. This plan was to have been executed at a convenient spot on the road from Newmarket to London, where there was a farm called Rye-house, belonging to one of the conspirators named Rumboldt; but the plan was frustrated by the king and his brother returning from Newmarket earlier than was expected. Soon after information of the matter was laid before one of the secretaries of state, and it was added that since this plot had been frustrated the plan for a general insurrection had been taken up by various eminent persons, among whom were those mentioned. A general insurrection had indeed been talked of, and the details and probable success of such a scheme appear to have been considered by the accused persons; but there was no evidence to show that the promoters of the wider scheme were involved in the minor plot, which was engineered, after the general insurrection had first been talked of, by a few of those already concerned in the larger plan. Yet from the way in which the revelations were made to the government the two schemes were completely confounded, and Russell, Essex and Sidney were arrested on the charge of treason. Essex put an end to his own life in the Tower, and Russell and Sidney were condemned and beheaded. Lieutenant-Colonel Walcot, one of the real contrivers of the Rye-house Plot, was at the same time brought to the block.

RYERSON, rī'ẽr-sŏn, **Adolphus Egerton,** Canadian Methodist: b. Charlotteville, 24 March 1803; d. Toronto, 19 Feb. 1882. He entered the Methodist ministry in 1825; and became identified with the Methodist Episcopal Church of Canada at the organization of that body in 1828. In 1832 he went to England to form a connection with the parent body. In 1842 he became first president of Victoria College and in 1845 was appointed superintendent of education for the province of Upper Canada, a position he retained for 30 years. Besides founding and editing *The Christian Guardian,* he wrote 'A Manual of Agricultural Chemistry'; 'The Clergy Reserve Question'; 'Compulsory Education.' Consult Ryerson, Egerton, 'The Story of my Life' (1884).

RYEZHITZA, Russia, town in the government of Vitebsk, situated about 150 miles northwest of the town of Vitebsk and on the Petrograd-Warsaw Railroad. It was founded by the Teutonic Knights in 1285 with the object of holding in check the turbulent Lithuanians and their neighbors the Letts. It was the object of frequent attacks by these peoples. It was called Roziten in the Livonian chronicles and in 1561 was traded to Poland. The Russians took it in 1567 and a second time 10 years later. In 1656–60 it was captured by the Swedes and its fortifications razed. In 1773 it became part of the Russian Empire. It enjoyed increased prosperity in the 19th century and in the same period its population grew to about 12,000.

RYGH, rug, **Oluf,** Norwegian archæologist: b. Stiklestad, 1833; d. 1899. He received his education at Trondhjem and at the University of Christiania, where he was for 40 years successively director of antiquities, professor of Scandinavian archæology and professor of history. His great work, however, was in reducing to system the archæology of Norway. His best-known works are 'Om den ældre Jernalder i Norge' (1869; Fr. translation, 1869); 'Om den yngre Jernalder i Norge' (1877); 'Norske Oldsager' (1880–85); 'Norske Gaardnavne' (15 vols., 1897 et seq.).

RYLAND, Henry, English artist: b. Biggleswade, Bedfordshire. He was trained in art at the South Kensington schools and worked at Paris in the studio of Benjamin Constant, and at Julien's Academy under Boulanger and Lefebvre. His practical professional life was begun by him as a designer of stained glass and he contributed to the *English Illustrated Magazine* in its early days. His first work as a painter was exhibited at the Grosvenor Gallery, but he has since exhibited, chiefly water-colors, at the other exhibitions of London, and many of his pictures have been engraved.

RYLAND, William Wynne, English engraver: b. London, July 1738; executed Tyburn, 29 Aug. 1783. He acquired his professional training from Ravenet and at Paris from Boucher and J. P. le Bas. He spent several years on the Continent and after his return to his native country executed portraits of Lord Bute, George III, Queen Charlotte and the Princess Royal with such success that he was given the official post of engraver to the king. He became a member of the Society of Artists in 1766 and was a frequent exhibitor. In his later years he abandoned line-engraving for the so-called «chalk-engraving» of stippled dots. In

the latter style he left copies of several old masters. He was a man of extravagant habits and after a series of troubles with his creditors was convicted of forgery, then a capital offense, and executed.

RYLANDS, John, English manufacturer: b. Saint Helens, Lancashire, 7 Feb. 1801; d. Stretford, 11 Dec. 1888. He received his education at the Saint Helens grammar school. In co-operation with his father and elder brothers, he founded at Wigan in 1819 the cotton and linen manufacturing firm of Rylands and Sons. As the business expanded, bleach-works and dye-works were added to their plant and a coal mine was discovered beneath the firm's property, which added greatly to their wealth. About 1826 several spinning mills were added at Bolton and other centres. In 1847 John became sole conductor of the business and in 1873 it became a limited liability company. The concern is now one of the largest in Great Britain. Rylands helped finance the Manchester Ship Canal and was active in philanthropy. The John Rylands Library at Manchester was erected as a permanent memorial by his widow in 1899.

RYLE, rīl, John Charles, English Anglican bishop: b. Macclesfield, Cheshire, 10 May 1816; d. Lowestoft, Suffolk, 10 June 1900. He was educated at Oxford, took orders in the English Church, and was successively curate at Exbury, rector of Saint Thomas', Winchester (1843), of Helmingham, Suffolk (1844) and vicar of Stadbroke, Suffolk (1861). He was appointed honorary canon of Norwich, in 1872, and in 1880 was nominated dean of Salisbury, but before he had taken possession of this post was made bishop of the newly formed see of Liverpool. He was one of the most prominent members of the Evangelical party, and besides publishing numberless tracts which were widely popular, was author of such books as 'Coming Events and Present Duties' (1867); 'Bishops and Clergy of Other Days' (1868); 'The Christian Leaders of the Last Century' (1869); 'Expository Thoughts on the Gospels' (1856–69).

RYLSK, Russia, town in the government of Kursk, 70 miles southwest of the town of Kursk, on a branch of the Kursk-Kiev Railway. Its industrial establishments comprise oil works, blast furnaces, soap and tallow factories, etc. There is a large trade in corn, hemp and agricultural implements. The town was founded in the 9th century and has a 15th century cathedral. Pop. 12,000.

RYMER, Thomas, English critic and antiquary: b. Yafforth, Yorkshire, 1641; d. London, 14 Dec. 1713. He studied at Cambridge, subsequently kept terms at Gray's Inn, and was called to the bar in 1673. In 1678 he published 'Edgar, a Tragedy.' In 1692 he succeeded Shadwell as historiographer royal, and was entrusted with the preparation of a collection of public treaties, which he began to publish in 1704, under the title of 'Fœdera, Conventiones, et cujuscunque Generis Acta publica, inter Reges Angliæ et alios Principes.' Of this valuable and learned work he completed 15 volumes, and five more were afterward added by Robert Sanderson. The publication of the whole work was completed in 1735.

RYMER, Thomas, of Ercildoune. See RHYMER, THOMAS THE.

RYOTWAR, rī'ŏt-wär, in India, the lease of land by the government officers to the ryots or native cultivators at a fixed rent, a practice chiefly prevalent in the Madras Presidency.

RYSBRACK, rüs'brāk, **John Michael,** German sculptor: b. Antwerp, 1693 or 1694; d. 8 Jan. 1770. He went to England in 1720 and made a reputation by the exercise of his art, of which Westminster Abbey and several cathedral churches contain examples, among which may be mentioned the monuments of Sir Isaac Newton and the Duke of Marlborough. He also produced the equestrian statue of William III, at Bristol and the statue of Locke at Oxford.

RYSWICK, rīz'wĭk **(RIJSWIJK),** Netherlands, a village between Delft and The Hague, famous for the celebrated treaty concluded there in September 1697, and known as the 'Peace of Ryswick,' signed between France, England, Spain, Holland and the Empire. It terminated a bloody nine years' war of the Grand Alliance against France. Louis XIV relinquished his recent conquests except Strassburg, which was taken in 1861; he abandoned Lorraine and Luxemburg, acknowledged the independence of Holland, repudiated the Stuarts and recognized the Protestant succession in England (William III).

RYSWICK, Peace of. See RYSWICK.

RZHEV, rzhĕf, Russia, in the Tver government, occupies the heights on both banks of the Volga. It is a railway terminus, about 90 miles southwest of Tver and the centre of a great transit trade between the provinces of the lower Volga and the ports of Petrograd and Riga.

S

S the nineteenth letter and fifteenth consonant of the English and several other alphabets, is classed as a sibilant or hissing letter. The sibilant is produced by emission of the breath while the end of the tongue is brought close to the front palate just behind the gums: this is the hard open sound; the corresponding soft open sound is represented in the alphabet by *z*, but in practice is often represented by *s*. The form S is the Semitic *shin*, and the ancient Greek character ς (sigma) with its angles rounded; in the existing Greek alphabet the s is represented by Σ. In some English words s is silent: island, aisle. The final *th* of verbs has changed to *s* because of the nearness of sound of *s* to *th: loveth, loves; hath, has.* There are several words in English — and the like can be said of Greek — which, beginning with *m* or *p* or *l*, take on an initial *s; melt, smelt; pike, spike; lick, slick;* Gr. *mikros, smikros.* Compare Ger. *niesen;* Eng. *sneeze.* The palatalization which is so characteristic of English and the romance languages has had the effect of generally giving to *c* or *sc* before *e, i* or *y* the sound of *s.* Sometimes the sound of *s* is changed to that of *st*; the verb *hoise* becomes *hoist, whiles* becomes *whilst*; and there is the mispronunciation of *once, onst*; and the plural of *mouse* is *mice.* The digraph *sh* stands usually for the ancient sc (sk): Old Eng. *sceal,* shall, fisc, fish. It is pronounced with the edges of the tongue appressed to the teeth, but with the centre free; *s* alone represents this sound in *sure, sugar, issue,* etc. This sound is a surd; *s* represents its sonant *in osier, measure,* etc.; *sh* is replaced by *ch* in *machine; ci* in *social; sci* in *conscience; ti* in *martial,* all of which words are of Latin or French extraction. S stands for *south, second, sulphur, shilling,* and in combinations for science or society. SS. stands for steamship. See ALPHABET.

S. P. Q. R., the initial letters of Senatus Populusque Romanus (the Senate and the Roman people), which expressed the political character of the Latin nation. These initials were carried as a battle standard by the Roman armies.

SS., commonly used at the head of affidavits and other legal documents, follows the brace which includes the state and county names where the paper is witnessed or the action at law laid. On legal documents SS. or ss. (scilicet), it is said, signifies "to wit," "namely."

"SS" is also "a symbol of unknown antiquity worn on the collars of the superior judges and lord mayors of England; formerly by persons attached to the royal household and others. It was assumed by certain classes, never bestowed and had no connection with heraldry." — Storemouth.

From being an ornament of royalty, supposed originally to signify "sovereignty," it became the badge of followers of the house of Lancaster and passed unofficially to persons in authority, like magistrates, mayors and justices; and from being used upon the collar came to be used on official writings to indicate the authority of the magistrate, mayor or judge who gave the same.

The mysterious "ss" is then, we may conclude, a symbol of official position. Whatever the origin of the symbol, the "esses" is an ornament, passed into a sign of judicial or magisterial authority, and as such follows the name of the State or county where a document is witnessed or an action at law is laid.

SÁ DE MIRANDA, Francisco de, frän-thēs'kō dā sä dā mē-rän'dä, Portuguese poet: b. Coimbra, Portugal, 27 Oct. 1485; d. there, 15 March 1558. He wrote much in Spanish, taking for his models Dante and Petrarch, but in sentiment remained entirely loyal to his native country. His fame rests chiefly upon his poetical epistles and eclogues, though his entire work is excellent and characterized by sincerity and love of natural beauty. He is ranked as one of the six greatest Portuguese poets. An edition of his work edited by Caroline Michaëlis de Vasconcellos contains 189 of his pieces, 74 of which are in Castilian.

SAADJA GAON, sä-ăd'yä gä-ōn' (SAADJA BEN JOSEPH, Arab SAID), Jewish Rabbin: b. Fayum, the Biblical Pithom, Egypt, 892; d. Babylonia 941. In 828 he was appointed Gaon or principal of the Jewish Academy at Sura, near Babylon, into which dwindling institution his zeal and learning infused new life. His acquirements were many and varied, living in a time when philosophy and reason were in danger of usurping the authority hitherto wielded by tradition, to which end the Karaites particularly contributed. It was the work of Saadja to discover a common ground for the maintenance of Jewish dogma side by side with philosophical theory. This was the object of his great work, written in Arabic, 'Emunot w'deot' ('Faith and Ethics') which was translated into Hebrew by Juda ibn Tibbon (1160) and into German by Fürst (1845). Saadja wrote a commentary on some of the books of the Old Testament, treatises on grammar and hymns for the synagogue. On the 1000th anniversary of his birth a complete edition of his works was published by Joseph Derenbourg. Consult Grätz, 'Geschichte der Jüden' (1870); Guttmann, 'Die Religionsphilosophie des Saadja' (1882).

SAALE, zä'lĕ, Germany, the name of several rivers, flowing between Baireuth and Hof, in the northeast of Bavaria. The most important of these is the river rising in the north side of the Fichtelgebirge at an altitude of 2,390 feet. It is navigable from Naumberg and passes Kahla, Jena, Kainburg — it becomes very circuitous passing Merseburg and Halle, and finally connects with the Elbe, near Leipzig, by canal. It flows through a fertile and picturesque valley for 200 miles, its romantic heights crowned by many castles. It is of great commercial value, having a wide and deep channel in the greater part of its length.

SAARBRÜCKEN, zär'brük-ĕn, or **SANKT-JOHANN SAARBRÜCKEN,** Germany, in the Rhine province, Prussia, is situated on the Saar, 39 miles southeast of Treves. Its sister-town across the river gives the town the double name. It is an important industrial centre, is well built, and has a castle. There is a celebrated mining academy and a monument to Bismarck. The principal industries are wool-spinning, brewing and the manufacture of tobacco, chemicals, tin and stoneware. Trade is mainly dependent on the coal mines, the glass and iron works of the district. In 1870 the French and Prussian forces fought here the first engagement of the Franco-German War resulting in a partial victory for the French, which the Germans retrieved four days later by their first victory at Spicheren in the vicinity. Pop., including Sankt-Johann about 106,000.

SAB, or **ESPATOLINO.** 'Espatolino' of Gertrudis Gómez de Avellaneda, a Cuban who lived the greater part of her life in Spain, was written in 1844. Espatolino is a famous Italian bandit who wreaks vengeance on society by means of robbery and murder and who is captured only through treachery. The novel was at one time very popular during the vogue of Scott, Dumas, Hugo, and Georges Sand, all of whom influenced Señora Avellaneda. Espatolino is characteristic of her work which is passionate and lyrical. She was a gifted poet and rises to eloquent heights in Espatolino's tirades against the established order of things social. Her work, however, has waned in popularity since the passage of time has ameliorated conditions in prison life and methods of punishment of criminals. Espatolino is a combination of Jean Valjean and Robin Hood. He is not a vulgar fugitive from justice; he has a noble, generous soul and in true Romanticist fashion strikes back hard at his pursuers. Annunziata is a passionately devoted wife who consecrates her life to the uplift of her husband, but who fails through the treacherous machinery of man-made justice and is driven insane. 'Espatolino' may be found in the fourth volume of the author's *Obras Literarias,* Rivadeneyra, Madrid 1870. For a full critical estimate of 'Espatolino,' consult 'Biografia de G. G. de Avellaneda' by Aurelia Castillo de González.

SAMUEL M. WAXMAN.

SABA, sā'ba, one of the Leeward Islands, Dutch West Indies, area five square miles. It is high and rocky, rising abruptly from the sea to a height of nearly 3,000 feet. A small part is under cultivation; the chief products are tropical fruits and vegetables, especially cabbages and cotton. Fishing is also an important industry, and fishing boats are built on the island. The inhabitants are the descendants of Dutch and Scandinavian pirates who occupied the island in the 17th century. The island nominally belongs to Holland, but the people are practically independent, being exempt from taxes and electing their own governor. Pop. about 3,000.

SABADILLA, or **CEVADILLA,** the pharmaceutical term for seeds of a liliaceous plant (*Schœnocaulon officinale*), growing in Central America, with a bulbous root, grass-like leaves and a flower-stalk some six feet in height. The papery, tri-capsular fruits contain a few pointed, wrinkled, blackish seeds, persistently acrid and sternutatory, a powerful irritant and poisonous. They are employed for preparing veratrine, which, in the form of a tincture or ointment, is used as an external application for neuralgia and rheumatism, but is likely to prove poisonous if the skin be broken, thus permitting absorption. Sabadilla has also been given as a vermifuge but is dangerous, and is used for killing vermin.

SABÆANISM, sā-bē'an-ĭzm, or **SABIANISM,** a religion whose believers were once numerous in Arabia, Syria and Mesopotamia, which while it recognized only one supreme being, also worshipped, or paid high reverence to angels, or inferior divinities, supposed to reside in the stars. This part of the Sabæan creed virtually amounted in practice to star-worship.

SABÆANS, an ancient people of Arabia, information of whom we have nothing except the mention made of them in the Bible and other contemporary literature to which must be added archæological remains of various kinds including coins, carvings, inscriptions and buildings, generally in a very ruined condition. The Sabæan clans seem to have been quite extensive and to have been of considerable importance and influence in their day. They extended from southern into northern Arabia. The Queen of Sheba, who visited Solomon, is said to have belonged to the Sabæans; and the traditions which long told of her wealth and power, whether based on legend or history, or both, are but a reflection of the popular estimation of her people. Much speculation has been indulged in as to the real meaning of the visit of the Queen of Sheba to the Courts of Solomon; and some critics have seen in the event a political alliance of two important peoples against their common enemy the Minæans. All the Biblical references to the Sabæans convey ideas and pictures of their greatness and their commercial activity. There are indications that already in the 8th century B.C., the Sabæans had assumed active commercial and other relations with Assyria and had taken possession of territory in northern Arabia. From inscriptions and other archaeological remains the names of 15 Sabæan priest-kings ruling between 750 and 525 B.C., have been recovered; and from this later date there are more or less accurate lists of other rulers. The Sabæans in southern Arabia seem to have been known, at a comparatively early date, by both Greeks and Romans as the people of Yemen. In 24 B.C., when the breath of Roman domination was in the air, an armed expedition under

Ælius Gallus was sent to subdue the southern Sabæans. But here the Romans met with defeat. That the Sabæans were well known to the Latin world and that there was considerable interest in them in Rome, there is evidence in the fact that Pliny describes them at some length. Powerful though they once were the Sabæans finally became subject to the Himyarites, who seem to have retained dominion over them until 525 A.D., when they were subdued by the Aksumites, who were finally expelled from the country in 570. But the independence of the Sabæans did not long continue for it was soon swept away by the wave of Mohammedan conquest. No doubt further excavations and unearthed records will rather increase than diminish the importance of the Sabæans in the history of civilization in western Asia during from 800 to 1,000 years immediately preceding the Christian era. That they carried on extensive commerce with all the surrounding nations and extended their trade relations into Egypt and India there is plenty of evidence. A vast amount of material relative to Sabæan customs, life and history has been collected. This includes over 1,000 inscriptions made by Glaser alone. But the work of translation and publication has lagged far behind that of excavation. Therefore much new light may be expected to be shed soon on the history, customs and mythology of the ancient Sabæans.

«Sabæans» is also the name given to a modern eastern sect, the «Christians of Saint John,» because they deny the Messiaship of Jesus and exalt John the Baptist.

The ancient star-worshippers of Western Asia were also called Sabæans (from *tseba,* the host, that is of heaven, like stars).

The name was also applied to the descendants of Saba (Seba) who, tradition says, settled in Ethiopia.

To the Jews, the Sabæans, even in the time of Christ, were «a people afar off» or of «the southland,» who were rich in frankincense and aromatic myrrh, a people coming «from the earth's extremes.» Consult Glaser, E., 'Skizze der Geschichte und Geographie Arabiens' (Munich 1899); 'Die Abessinier in Arabien und Afrika' (Munich 1895); Nielsen, D., 'Neue Katabanische Inschriften' (1906).

SABAISM, an ancient natural religion that extended through the countries of the Assyrian and Medo-Persian empires as far as Asia Minor, between the Caspian Sea, the Euxine and the Mediterranean, from the Armenian Mountains as far as the banks of the Nile and southern Arabia. It assumed different forms in different countries, being sometimes more sensual, sometimes more spiritual. The objects of worship were the sun, the moon and the planets, or rather the planetary spirits of which the planets were believed to be the frame or the body. The worship of the sun (a female deity) was especially cultivated in Babylon and Phœnicia. The worshippers of the stars generally ascribed to them a great influence upon and a knowledge of terrestrial affairs; and astrology and the casting of nativities were, therefore, the natural result of Sabaism. The astrological system was most largely developed by the Egyptians, while Parseeism was the purest and most perfect form of Sabaism. In the Koran the star worship of ancient Arabia is designated by the name Sabaism. In the town of Haran, in Mesopotamia, a kind of Sabaism maintained itself, surrounded on all sides by Christianity, until the Middle Ages. One sect of Sabæans believed in the migration of the soul and in great world-periods, constantly renewed in an everlasting revolution. Oracles, sacrifices and massive temples were features of Sabaism. Incense was offered to the gods and used to purify the temples. The priesthood formed a powerful and well-organized body to whom tithes were paid in the name of the gods. There was generally a temple connected with each Sabæan fortress. The Sabæans, who were a people skilled in the mechanical arts, great traders and wealthy, made handsome gold and silver statues of their chief gods. Consult Glaser, E., 'Skizze der Geschichte und Geographie Arabiens' (Vienna 1889); 'Altjemenische Nachrichten' (Vol. I., 1906); Hommel, 'Aufsätze und Abhandlungen' (1892); Mordtmann, J. H., 'Muséa Impérial Ottoman' (Constantinople 1895); Nielsen, D., 'Die Altarabische Mondreligion' (1904); 'Neue Katabanische Inschriften' (1906); 'Der Südarabischer Gott Ilmekah' (1909); Weber, O., 'Gottes Symbole and Südarabischen Denkmäler' (in the 'Hilprecht-Buch,' 1909).

SABAL, or **CABBAGE PALMETTO,** the most northern arborescent palm in the world. It is a tree attaining 80 feet in height. Until it is from 10 to 20 feet high, its straight, robust stem is surrounded by the dry fibrous sheaths and the stubs of petioles of leaves project like spines and give a very picturesque and characteristic appearance. The leaves, massed at the top of the trunk are cordate, or fan-shaped, narrowly pinnatifid, each division cleft at its apex and recurved at the summit. The terminal bud, by which growth is continued, or «cabbage,» is a favorite delicacy with the negroes, who cut it out of the young and healthy trees,— thereby causing the ultimate death of the palmetto — and cook it as a vegetable. Many palmettoes are killed by the removal of the tops of the young trees. These tops are sent to factories, where they are trimmed down to a disc some eight inches thick, the soft central parts are cut out and the disc is then boiled to loosen the fibres of the sheaths and petioles, which are made into scrubbing brushes. These buds for brushes are worth only about six or seven cents apiece and yet the trees are being exterminated for so slight returns. The mature leaves are used for thatching and the trunks resist teredos to such an extent that they are valuable for submarine pilings.

This palmetto has always been interwoven with the history of South Carolina, the «Palmetto State.» A fortification, or stockade, on Sullivan's Island in Charleston Harbor, 1776, was composed of earth and palmetto logs and succeeded in repulsing the attacking British fleet under Sir Peter Parker, whose shot had practically no effect on the wall, for they could not split the spongy trunks, but were imbedded in them. Therefore, in memory of this event, the palmetto tree appeared on the seal of South Carolina, over an uprooted branchless oak-tree representing the oaken ships of England; on a flag adopted after the Ordinance of Secession

(1861) was passed; and also on a medal. At the signing of the secession ordinance, palmetto trees flanked the platform and at the back was the banner of the convention, bearing among other curious devices, a most unnatural palmetto, with a gigantic rattlesnake wound about its trunk. Cockades, rosettes of blue ribbon with a palmetto imprinted on a button in the centre, were worn by Charlestonians in 1860–61.

SABALO, a name of the tarpon (q.v.), further known as savalle, savanilla, grande ecaille, silver-king, etc.; also of the Hawaiian milkfish (*Chanos chanos*).

SABAOTH, săb'ā-ŏth, or sa-bā'ŏth, **Lord God of,** a term used in the Scripture, meaning "Lord God of Hosts." It has no connection with the word Sabbath.

SABATIER, sà-bà-tē-ā, **Paul,** French theologian and historian: b. Saint-Michel-de-Chabrillanoux, Ardèche, 3 Aug. 1858. He was educated in the theological faculty of Paris, and in 1885 became vicar of the French parish of Saint Nicholas at Strassburg. The German government offered him a superior appointment, involving his becoming a German citizen; he requested to be allowed to retain his post as vicar, but the request was viewed as a political manifestation, and he was banished from the country. For a brief time he was pastor of Saint-Cierge-la-Serre; then he withdrew from the ministry to devote himself wholly to historical studies. His chief work is 'La Vie de Saint François d'Assise' (1893), based largely on previously unutilized documents discovered by him in various Italian archives. Within a year from the appearance of the first French edition, editions had appeared in almost all Continental languages, including Swedish and Polish. The Russian version was prepared under the direction of Tolstoi. Sabatier published also 'La Didaché ou l'enseignement des douze Apôtres' (1885), and editions of the 'Speculum Perfectionis' by Leo of Assisi (1898; translated into English by S. Evans as 'Saint Francis of Assisi, the Mirror of Perfection' (1898), and of the 'Tractatus de Indulgentia') (1900), of Franciscus Bartholus. He also has published 'Modernism' (1908); 'L'orientation réligieuse de la France actuelle' (1911). Consult article by Rawnsley in *Contemporary Review,* Vol. 74, pp. 505–518 (1898).

SABAZIUS, sa-bā'zhĭ-ŭs, a Phrygian divinity, identified by the Greeks in part with Zeus and in part with Dionysus. His symbol was a serpent. His worship extended to Greece, and was found also in Italy, especially in late pagan times. In 'De Corona' Demosthenes describes various ceremonies connected with the mysteries of this deity, and he was said to have been the first to employ oxen for plowing.

SABBATAI ZEVI, săb-bā-tī' zĕ-vē', whose name is also spelled "Sabtai Zefi" and Sabbathais Zevi, a pretended Messiah: b. Smyrna, 1626; d. 1676. He was a man of great learning and magnetic presence, and he led thousands of followers, mainly in Smyrna, Salonica, Alexandria and Jerusalem, to believe in him as the Messiah. In 1664 he had about 80,000 followers. In the following year the beginning of the Messianic reign within a few months and the rebuilding of the Temple in the next year were proclaimed in the streets of Alexandria by Sabbatai and six disciples, clad in white raiments, with garlands on their heads. Having excited serious alarm at Constantinople, he was apprehended at Smyrna, and terrified into a recantation of his mission. He was said to have declared that his sole object had been to embrace Islam and to carry over all the Jews with him. The sultan declared himself satisfied and honored him with the title of an effendi, giving him an honorary post at the same time. He again aroused the jealousy of the Turks and was either poisoned in prison or publicly executed.

SABBATARIAN CONTROVERSY, the dispute in various forms between those who urge and those who oppose a rigid observance of Sunday. It has been going on from the time of King James I, of England, who favored Sunday sports, and hereby offended many of his subjects, and it has in late years included proposals to throw open to the public museums, libraries and galleries and other places of recreation and instruction, on the first day of the week. Most of these changes have been generally adopted.

SABBATARIANS, a term applied to those who urge rigid observance of Sunday. It was applied also in earlier times to the sect now known as Seventh Day Baptists, who observe Saturday for Sunday, and who, for that reason, are permitted in Rhode Island, where they are comparatively numerous, to work on Sunday.

SABBATH, the ancient Hebrews' weekly day of rest. In Hebrew the word means to cease, and the expression of Josephus (Apion ii, 2), who explains it as meaning "a rest from all labor," is rather to be looked upon as a commentary than as a derivation etymologically correct.

The Sabbath was the seventh day of the Hebrew week and lasted from sunset on Friday to sunset on Saturday. It was celebrated as a holy day; a day of rest and rejoicing; by ceasing from all labor, and by causing servants, strangers and cattle to cease also. Plants even were to rest; they were neither to be sown nor reaped on that day. The services of priests and Levites in and about the tabernacle and temple were, however, to be performed through the Sabbath-day. Circumcision, too, could take place on the Sabbath, when it fell on the eighth day after the birth of a male child.

Profanation of the Sabbath was punished by stoning to death. It was not until after the exile that the character of the work by which the Sabbath could be profaned was strictly defined. In the law only one act of labor was specifically prohibited, that of lighting a fire for the purpose of cooking. According to Josephus armies never proceeded on their march on the Sabbath. The Pharisees forbade even the plucking of grains of corn on that day; the healing of a sick man, or the walking of a cured patient bearing his bed. According to the Mishna even a broken bone was not to be set, nor dislocations poulticed or bound up on that day.

Origin of the Sabbath.— The Sabbath appears to have been an institution of religion long prior to Moses. It is sometimes said that it was borrowed by him from older nations, such as the Egyptians. Such Latin writers as Seneca and Ovid give intimations that the veneration for the seventh day had found some favor among the early Romans. It seems more natural to suppose that it had come down with the old traditions of theocratic religion which are found embalmed in the first chapter of Genesis. The poem of the creation, in which God is related to have created the world in six days and rested on the seventh day, embodies a tradition much earlier than the period of Mosaic legislation. There are several intimations in the patriarchal age that the followers of Jehovah, such as Abraham and Isaac, chose certain times for rest, meditation, prayer and sacrifice to God. In after times it would almost seem as if the poem or hymn of the creation was used as a special part of Sabbath-day devotions. On that day the people were called to reflect upon the fact that the whole universe, including themselves, had an origin in one personal and supreme Being; that He had exerted His Omnipotence for a definite period and then had ceased from His work. They were constantly to remind themselves of the work of God, once for all completed, by their own six days' round of labor; and as God has rested from His work so were they to rest from theirs and to turn their thoughts toward Jehovah "who had done so great things for them."

Mosaic Ordinances of the Sabbath.— The scope and meaning of the Sabbath-day was very much extended and amplified by the provisions of the law as contained in the Hexateuch. It was made to be a day on which not only the finished task of creation was to be commemorated, but on which the great providential deliverances of the children of Israel were likewise to be recalled. But first of all the command is given by the law in various forms of speech, but with the same intent throughout the books of the law, Exodus, Deuteronomy and Leviticus, to remember the seventh day, the Sabbath, to keep it holy; most specifically in Lev. xxiii, 3: "Six days shall work be done: but the seventh day is the Sabbath of rest, an holy convocation; ye shall do no work therein: it is the Sabbath of the Lord in all your dwelling."

First of all there are three specifications as to the manner in which the week is to be spent: (1) by labor — "Six days shalt thou labor, and do all thy work:" (Ex. xx, 9); (2) by rest on the seventh day; on this day the people are ordered to rest, literally to take breath, then are enumerated in detail those who are enjoined from work: "Thou, nor thy son, nor thy daughter, thy manservant, nor thy maidservant, nor thy cattle, nor the stranger that is within thy gates." The penalty of death is threatened against all who shall disobey this command. The reasons of this command are given: (1) as a counsel of mercy — "Six days thou shalt do thy work, and on the seventh day thou shalt rest, that thine ox and thine ass may rest, and the son of thine handmaid, and the stranger, may be refreshed" (Ex. xxiii, 12); (2) as a commemoration of the deliverance from Egypt — "And remember thou wast a servant in the land of Egypt, and that the Lord thy God brought thee out thence through a mighty hand and by a stretched out arm, therefore the Lord thy God commanded thee to keep the Sabbath day" (Deut. v, 15); (3) as a commemoration of the finished creation "For in six days the Lord made heaven and earth, the sea, and all that in them is, and rested the seventh day: wherefore the Lord blessed the Sabbath day, and hallowed it" (Ex. xx, 11); (4) as a sign of the covenant, just as circumcision was the sign of the Abrahamic covenant, and the rainbow the sign of the covenant with Noah — "Speak thou also unto the children of Israel saying: Verily my Sabbaths ye shall keep, for it is a sign between me and you throughout your generations, that ye may know that I am the Lord that doth sanctify you. . . . It is a sign between me and the children of Israel for ever: for in six days the Lord made heaven and earth, and on the seventh day He rested, and was refreshed" (Ex. xxxi, 13, 17).

The Jews of to-day who profess to keep up the tradition of their fathers still keep the Sabbath as a joyful festival. The Sabbath is held from Friday evening to Saturday evening. It is among some of them considered a pious observance to begin the celebration half an hour before Friday's sunset and to continue it half an hour after sunset on Saturday for the benefit of the souls of those who are in torment, for they believe that the damned are allowed a mitigation of their suffering during the feast. On Friday afternoon all the food for the following day is prepared, and their festal array is laid out for the Sabbath. Some Jews have special raiment which they wear only on that day; on the morning of which the Sabbath lamp is lit and the Sabbath bread laid on the table. The master of the house at the close of the evening meal blesses the wine and passes it around. They eat three meals on the Sabbath-day and they have a maxim that it is good to honor the day in the body, in dress, in eating and in drinking. Consult Abrahams, Israel, 'Jewish Life in the Middle Ages' (London 1896); Floody, R. J., 'Scientific Basis of Sabbath and Sunday' (2d ed., Boston 1906); Jastrow, Morris, 'Hebrew and Babylonian Traditions' (New York 1914); Lotz, Wilhelm, 'Quæstiones de historia Sabbati' (Leipzig 1883).

SABBATIA, a genus of *Gentianaceæ,* often growing in sand or salt marshes. These plants have verticillate leaves, handsome terminal flowers, with white or pink rotate corollas 5 to 12-merous; 4 to 12 stamens with thread-like filaments and two-cleft styles, capsules more or less globose, coriaceous and containing many small reticulated seeds. Several species have a tonic, although bitter, juice, and are used as febrifuges. Although named in honor of an early Italian botanist, Sabbati, the genus is said to be so called because the Pilgrim Fathers discovered the local *S. stellaris* on a Sabbath. This charming species, called the marsh pink, or Rose of Plymouth, bears a very delicate pink flower, with a star-shaped yellowish eye.

SABBATICAL YEAR, the seventh year which the law of Moses provided should be a year of rest for the land (Ex. xxiii, 10, 11; Lev. xxv, 1–7). The land was not to be sown and that which grew of its own accord was not to be reaped, but to be left for the poor to eat. Vineyards and oliveyards were also to be left uncultivated, and their produce ungathered; but the people were allowed to fish and hunt, and attend to their bees and flocks, and a triple produce was promised for every sixth year to

make up for the deficiency of the seventh. The sabbatical year was also to be a year of release for Jewish debtors (Deut. xv, 1–6), but those who were able to lend were strictly enjoined not to refuse loans to poor and needy persons because the year of release was at hand (Deut. xv, 7–11). In this year also the law was to be read solemnly to all the people assembled at the feast of Tabernacles (Deut. xxxi, 10). This institution seems to have been almost entirely ignored during the period which preceded the captivity, and in 2 Chron. xxxvi, 21, the time of the captivity is represented as one in which the land was enabled, by the will of God, to enjoy the sabbaths or years of rest that the Israelites had omitted to allow it. After the captivity Nehemiah sought to secure the better observance of the septennial sabbath, as he did that of the weekly sabbath (Neh. x, 31), and he seems to have had some success in the former as well as in the latter effort. The historic fact that Alexander the Great remitted the Jewish tribute in the seventh year because the Jews were debarred by their religion from employing the means of raising it, shows that it was observed a hundred years after the time of Nehemiah.

SABBATION, sȧb-bā'tē-ŏn, or **SAMBATYON,** sam-bā'tē-ŏn, Syria, a legendary river in Hebrew history, mentioned in the Midrash Gen. Rabba, lxxiii, in the Palestinian Talmud, by Josephus, as "the Sabbatic river," and by Pliny as "a river that ran for six days and rested on the seventh," whence its name, derived from the Hebrew *Shabbāth* — Sabbath. It has been assumed to be the stream issuing from Fauwar ed-Deir, an intermittent spring in Lebanon. Mohammedans identify it with the Nahr-al-Arus in the neighborhood described by Josephus, which in modern times flows every third day. The river came into prominence in the 9th century owing to the story of the 'Children of Moses,' by Eldad the Danite, who describes the territory of the site of the exile of the Ten Tribes as surrounded by "this river of sand and stone which rolls during six working days and rests on the Sabbath day. As soon as the Sabbath begins, fire surrounds the river, and the flames remain until the next evening, when the Sabbath ends." The legend with variants has been repeated by different authors in succeeding centuries. See LOST TEN TRIBES, THE.

SABELLA, a genus of annelids dwelling on sandy shores in tubes formed solely of sand, the particles of which are glued together by means of a natural cement secreted by the worms, and thus form a smooth regular tube, presenting a striking contrast in its uniformity to the rougher dwelling-tubes of allied genera, such as *Terebella.* The worm itself possesses a slender body, the hinder part of which may be doubled up within the tube. The head is provided with slender tentacles.

SABELLIANISM, the theological views of Sabellius (q.v.), which, though they had numerous advocates, were condemned by the Church as heretical. See MONARCHIANS.

SABELLIUS, sȧ-bĕl'ĭ-ŭs, Christian teacher: b. Pentapolis, Africa, or Italy. He taught at Ptolemais in Upper Egypt during the pontificate of Zephyrinus (199–217) and Calixtus I (217–222), and is known as the founder of a sect who considered the Son and Holy Ghost only as different revelations or manifestations of the Godhead, but not as separate persons (see MONARCHIANS). The doctrines of Sabellius were opposed by Dionysius of Alexandria and Dionysius of Rome, by Epiphanius (who states that the Sabellians were very numerous around Rome and in Mesopotamia) and by Theodoret. Saint Augustine states that by the beginning of the 5th century they had entirely disappeared. Yet their views have always found adherents, and even now some theologians attempt to reconcile theology with reason by admitting conceptions of the Trinity coinciding with that of Sabellius. For his teaching Sabellius was excommunicated by Pope Calixtus.

SABIANS. See SABÆANS.

SABIN, sā'bĭn, **Alvah Horton,** American chemist: b. Norfolk, N. Y., 9 April 1851. He was graduated at Bowdoin College in 1876 and was professor of chemistry at the University of Vermont in 1880–86, also serving as State chemist in 1882–86. In 1888–1905 he was engaged in the varnish business in New York, and since 1910 has been consulting chemist for the National Lead Company, New York. He has been lecturer at New York University since 1897. He invented the process for manufacturing sugar of milk in 1883. Since 1907 he has been sectional editor of the *Chemical Abstracts Journal* of the American Chemical Society. Author of 'Industrial and Artistic Technology of Paint and Varnish' (1904); 'German and American Varnish Making' (1911); 'Red Lead as Paint Material' (1917), etc.

SABIN, Edwin Legrand, American writer: b. Rockford, Ill., 23 Dec. 1870. He was graduated from the University of Iowa in 1892 and has published 'The Making of Iowa' (1900); 'The Magic Mashie' (1902); 'Beaufort Chums' (1905); 'When You Were a Boy' (1905); 'Bar B Boys' (1909); 'Range and Trail' (1910); 'Circle K' (1911); 'Old Four Toes' (1912); 'Pluck on the Long Trail' (1912); 'With Carson and Fremont' (1912); 'Treasure Mountain' (1913); 'On the Plains With Custer' (1913); 'Scarface Ranch' (1914); 'Kit Carson Days' (a biography, 1914); 'Buffalo Bill and the Overland Trail' (1914); 'Gold Seekers of '49' (1915); 'With Sam Houston in Texas' (1916); 'The Boy Settler' (1916); 'Opening the West with Lewis and Clark' (1917); 'The Great Pike's Peak Rush' (1917); 'How are You Feeling Now?' (1917); and contributions to magazines.

SABIN, Ellen Clara, American educator: b. Sun Prairie, Dane County, Wis., 29 Nov. 1850. Her father, Samuel Henry Sabin, served as first lieutenant in the 40th Wisconsin regiment in the Civil War. Miss Sabin studied at the University of Wisconsin in 1865–68, and in 1895 received from that institution the honorary degree of A.M. In 1912 Beloit College conferred on her the degree of Litt.D. and in 1915 she received the degree of LL.D. from Grinnell. Miss Sabin began her professional career in 1866 as teacher in the district school at Sun Prairie, Wis.; from 1869 to 1872 she was employed as teacher at Madison, Wis., where she became principal of the grammar school.

In 1873–85 she taught in Portland, Ore., spent the year 1885–86 in Europe, and in 1887–90 was superintendent of schools of Portland, Ore. In 1891 Miss Sabin became president of Downer College, Fox Lake, Wis., and since 1895 has been president of Milwaukee-Downer College. At the Columbian Exposition at Chicago in 1893 Miss Sabin was juror of the educational exhibit and from 1886 to 1892 was member of the National Council of Education.

SABIN, Joseph, American bibliophile: b. Braunston, Northamptonshire, England, 9 Dec. 1821; d. Brooklyn, N. Y., 5 June 1881. After apprenticeship to Charles Richards, bookseller of Oxford, he set up a bookshop of his own there, but in 1848 came to this country, where he conducted establishments for the sale of old and rare works in New York 1850–56, in Philadelphia 1856–60, and New York 1860–81. His bibliographical knowledge was wide, and he is said to have crossed the Atlantic not less than 25 times for the purchase of unique specimens. From 1869 he published for a number of years *The American Bibliopolist.* He also prepared several compilations, among them 13 volumes of an uncompleted 'Dictionary of Books relating to America.'

SABINE, SIR **Edward,** English physicist: b. Dublin, Ireland, 14 Oct. 1788; d. Richmond, Surrey, 26 June 1883. He was educated at the military colleges of Marlow and Woolwich and in 1803 entered the army where he was commissioned 2d lieutenant of artillery. He served in the war with the United States in 1813–14 and accompanied Ross and Parry in their Arctic expedition in 1818 and that of Parry in 1819–20. While on these expeditions he engaged in researches in terrestrial magnetism and in 1821–25 conducted a series of voyages extending from the Arctic regions to the equator, gathering data concerning the magnetic needle, the figure of the earth and other points in meteorological and terrestrial physics. He was instrumental in the establishment of permanent magnetical and meteorological observatories, retaining directorship of those in the colonies for many years. In 1818 he was elected to the Royal Society, was its vice-president in 1850 and in 1861–71 acted as its president. He received rank as lieutenant-general in the army in 1859 and was retired with full rank as general in 1874. His works include 'An Account of the Experiments to determine the Figure of the Earth' (1825); 'The Variability of the Intensity of Magnetism upon Many Parts of the Globe' (1838), etc.

SABINE, Lorenzo, American historian: b. New Lisbon, N. H., 28 Feb. 1803; d. Boston, Mass., 14 April 1877. He sat in the New Hampshire legislature for three successive terms, but removed to Massachusetts in 1849, and was a Whig member of Congress in 1852–53. He is best known for his important work on 'The American Loyalists, or Biographical Sketches of Adherents to the British Crown in the War of the Revolution' (1847). He also published 'Life of Preble' (1847); 'Reports on the Principal Fisheries of the American Seas' (1853); 'Notes on Duels and Duelling, with a Preliminary Historical Essay' (1856), etc.

SABINE, Wallace Clement, American physicist: b. 13 June 1868; d. 10 Jan. 1919. He was graduated at Ohio University in 1886 and at Harvard in 1888. He was, until he died, connected with the faculty at Harvard, was professor of physics there in 1905–14, and after 1914 Hollis professor of mathematics. He was agrégé professor at the University of Paris in 1916–17. Author of 'Architectural Acoustics' (1900).

SABINE, a river of the United States, which has its rise in the northeastern part of Texas, in Hunt County, flows southeast about 250 miles, then turns southward and forms the boundary between Texas and Louisiana, and enters the Gulf of Mexico through Sabine Lake and Sabine Pass. The mouth of the river is Sabine Pass, a narrow channel which is obstructed by a muddy bar. Considerable has been done to make this pass safe for navigation; jetty-building and dredging was begun as soon as the interior of Texas, near the Sabine River, was settled. Sabine Lake is an expansion of the river, but the Neches River also enters the lake. The Sabine River is about 500 miles long and is navigable in its lower course. See BOUNDARIES OF THE UNITED STATES.

SABINE, or **SABINE PASS,** Tex., town and port of Jefferson County, on Sabine Pass Harbor, between Sabine Lake and the Gulf of Mexico, 70 miles by water northeast of Galveston, on the Texas and New Orleans Railroad. The Pass has been improved by the Federal government at great expense, thus opening a water route for the regions reached by the Sabine and Neches rivers, exports from which include petroleum, lumber, grain, iron ore and sulphur. Extensive concrete wharves have been built by the oil and lumber companies, and the commerce of the port is increasing rapidly, being confined chiefly to exports. Exports, $50,923,702. Pop. 8,600.

SABINE CROSS ROADS, Battle of, and BANKS' RETREAT TO ALEXANDRIA. Three miles southeast of Mansfield, De Soto Parish, La., one of the main roads from Alexandria to Shreveport is crossed by a road from Red River to Sabine River. At this crossing was fought a battle which marked the culmination and failure of what is known as the Red River Expedition. On 23 Jan. 1864, General Banks, then at New Orleans, received a despatch from General Halleck, dated the 4th proposing an expedition, to consist of the forces of Banks, Steele and such as could be spared by Sherman, for the capture of Shreveport, La., on Red River, and the recovery of Texas, thus opening access to the cotton of that section and stimulating trade. Banks had, on a previous occasion, for sound reasons, objected to such a campaign, but now acquiesced and promised a cordial co-operation; but he set forth the difficulties in the way, and made suggestions to remove them, not one of which was regarded. Engrossed with duties concerning political affairs in Louisiana, which had specially been confided to him by the President, Banks could not immediately leave New Orleans, and he entrusted the arrangements of the expedition to Gen. W. B. Franklin, his second in command, who was to move from the Teche 5 March, reach Alexandria on the 17th, and co-operate with a strong fleet under command of Admiral Porter. Porter arrived at the mouth of Red River on 7 March, with

a fleet of 15 ironclads and four light steamers, and there he was joined some days later by transports from Vicksburg, carrying four divisions of Sherman's army, under Gen. A. J. Smith, and the Marine brigade of Colonel Ellet. A part of the plan of campaign was that General Steele, with an army of 15,000 men, should move from Little Rock, Ark., directly on Shreveport; but Steele, after marching from Little Rock to Camden, was checked, fell back to Little Rock and took no further part in the campaign. (See JENKINS' FERRY, BATTLE OF). Smith's forces advanced, attacked and in conjunction with the navy, 14 March, captured Fort de Russy, up Red River, together with 283 prisoners, 10 guns, and many small arms, the Confederate covering force of 3,500 men, under General Walker, after burning two steamboats and a considerable quantity of cotton, retreating up the river. It was not until the 19th that Franklin, with very little opposition, which was brushed aside by his cavalry, reached Alexandria. Banks joined him on the 24th, but his entire column did not close up until the 26th. Meanwhile General Mower, with three brigades of Smith's division and a cavalry brigade of the 19th corps, marched from Alexandria on the 21st for Henderson's Hill, 25 miles westward, surprised the 2d Louisiana cavalry, and with slight loss captured 250 men, nearly as many horses, and four guns, with their caissons. Near Alexandria the fleet came to a series of rapids, and the water was so low that the ironclads could not run up them, but after a week's hard labor the lighter ones were carried over. The transports, which could not pass, returned to Vicksburg, and with them Ellet's 3,000 men. The withdrawal of the transports made it necessary to establish a base at Alexandria and to use a wagon-train to carry the supplies, while it was also necessary to leave a guard of nearly 4,000 men (under General Grover) to protect the place. General Franklin, with the main column, advanced on the road running west of and parallel to the river, to Natchitoches, about 80 miles above Alexandria, driving before him the Confederate cavalry, and reaching Natchitoches on 3 April, where he was joined by A. J. Smith's column, which, accompanied by Porter's fleet, had come to Grand Ecore, four miles from Natchitoches. Porter had a fleet of 13 gunboats and 30 transports.

Banks' army, on the eve of march from Natchitoches for Shreveport, was composed of two divisions of the 13th corps, under Gen. T. E. G. Ransom; five brigades of the 16th corps, under Gen. A. J. Smith; Gen. W. H Emory's division, three brigades of the 19th corps; and Colonel Dickey's brigade of colored troops, under General Franklin; Gen. A. L. Lee's division of cavalry and mounted infantry, four brigades; and a small artillery reserve, under Captain Closson. These numbered 31 March 25,735 officers and men, with about 65 guns. Lee's cavalry force of 4,500 men had pushed out westward, 12 miles; on 2 April it ran across Confederate cavalry, drove it back eight miles, and then withdrew to wait for the general advance. This began on the morning of the 6th, led by Lee's cavalry, followed by the two small divisions of the 13th corps, under Ransom, and by Emory with a division of the 19th corps and Dickey's brigade of colored troops. On the morning of the 7th A. J. Smith followed with Mower's division of the 16th corps. A division of the 17th corps, 1,730 strong, under Gen. T. Kilby Smith, remained with the transports, under instructions to conduct them to Loggy Bayou, opposite Springfield, about midway between Natchitoches and Shreveport, 110 miles by the river, above Grand Ecore, where he was to halt and communicate with the army at Sabine Cross Roads. 54 miles from Grand Ecore. Porter, Smith and the transports, with six gunboats carrying 17 guns, started on the 7th.

Lee's instructions from General Franklin were to attack the enemy wherever found, but not to bring on a general engagement. On the 7th he drove a brigade of General Green's beyond Pleasant Hill, and came upon a strong force under Green at Wilson's Farm. Lee attacked and after a hard engagement of two hours drove Green to Saint Patrice's Bayou, eight miles from Pleasant Hill. Here Lee bivouacked for the night, and sent back for infantry support. His loss had been 53 killed and wounded. Green's loss was greater, including about 100 prisoners. That night Franklin reached Pleasant Hill; A. J. Smith's division was still a day's march in rear of Franklin. At daybreak of the 8th Lee, having been reinforced by one of Landram's brigades of the 13th corps, dropped his wagon-train, and, moving forward, drove the Confederates from Saint Patrice's Bayou and gradually pushed them to a wood beyond a clearing at Sabine Cross Roads, and found himself in the immediate front of Gen. R. Tayor's army of 10,000 men. Taylor, whose forces had been much scattered, in Arkansas, Louisiana, and Texas, had concentrated them, and near Mansfield had the three divisions of Generals Green, Walker and Mouton —10,000 men. On the morning of the 8th he moved three miles from Mansfield to Sabine Cross Roads and formed line in the edge of a wood, commanding, on both sides of the road, a clearing about 1,200 yards long, and 800 wide, through the middle of which was a deep ravine. He knew that Banks' column was stretched out on a single road for more than 20 miles, and was sanguine of success in attacking the head of it. Lee threw out a strong skirmish-line and waited for Banks' main body to come up. At noon Ransom arrived with a brigade, and line was formed. Banks rode up a little past noon, and sent back repeated orders for Franklin to hurry forward. After heavy and continuous skirmishing, lasting until 4.30 P.M., Taylor threw his entire force of 10,000 men heavily upon the Union line; Mouton's division and two brigades of dismounted cavalry made an impetuous charge upon the Union right, in which Mouton was killed at the first onset, while Walker's division and a brigade on its right fell upon the centre and left of the line. For nearly an hour the men (not over 4,500) of Banks' command resisted this attack, and then were compelled to fall back to the woods in rear of the open space at the cross roads, with heavy loss, including three guns. Franklin had come up with Cameron's division of the 13th corps, and a new line was formed, to be immediately broken by heavy attacks on both flanks and front. The Confederates were gaining the rear, and the Union line was pressed back along the

narrow forest road filled with wagons and mules of the supply-train, stragglers, and camp-followers, which so blocked the way that an orderly retreat was impossible. Soon a panic set in, the cavalry train of 156 wagons was captured, Ransom's 10 guns were taken, along with 1,000 of his men; Franklin and Ransom were wounded, some of the best officers were struck down; and in spite of the heroic efforts of Banks and others to rally them, nearly the whole army broke into a disorderly retreat, which was checked only at Pleasant Grove, three miles from the field of battle. Here General Emory, with his division, had come up at 6 P.M., and formed line in the edge of a wood, on a ridge overlooking a small stream; and scarcely had his line been formed when the panic-stricken fugitives came rushing back through it to the rear. The Confederates were close on their heels, made an immediate assault upon Emory, and were met with a severe fire delivered at close quarters that instantly checked them. After an hour and a half of fierce battle, in which they made desperate efforts to turn Emory's right, the Confederates were everywhere repulsed with great loss, but held the shores of the stream. Banks' army, after having advanced to within two marches of Shreveport, had been saved from total destruction "by a triumph of valor and discipline on the part of a single division and of skill on the part of its intrepid commander." The action is known as the battle of Pleasant Grove. The Union loss at Sabine Cross Roads and Pleasant Grove was about 1,050 killed and wounded and nearly 1,800 missing; the Confederate loss, 1,500 killed and wounded.

Banks had been limited as to time in carrying out the objects of his campaign. General Sherman was calling for A. J. Smith's troops, and General Grant, who had set his heart on a movement by Banks from New Orleans on Mobile, had written him: "I had much rather that the Red River expedition had never been begun, than that you should be detained one day beyond the first day of May, in commencing the movement east of the Mississippi." The allotted time was fast expiring, Banks concluded to abandon his expedition. The night of the 8th he fell back 15 miles to Pleasant Hill, which was reached by Emory's division, that brought up the rear about 9 o'clock next morning. A. J. Smith, with a part of his command, had halted at Pleasant Hill, on the evening of the 8th, and with less than 13,000 men Banks formed a double line; the first, of the 19th corps, along a thickly wooded slope half a mile west of Pleasant Hill; the second, of A. J. Smith's command and the artillery, on a plateau in rear. The trains, preceded by Lee's cavalry and Dickey's brigade of colored troops, and followed by the remnants of Ransom's division, were put on the road to Grand Ecore. General Taylor, reinforced by the divisions of Generals Churchill and Parsons, had followed Banks very cautiously, and at noon his advance appeared and began skirmishing. Later artillery was brought up and opened fire, and a demonstration was made on the Union right. About 5 P.M. three Confederate divisions charged out of the woods upon the left flank of the Union line, which was steadily driven back up the hill to the cover of the second line. Here the Confederates were repulsed with great loss. Meanwhile the right of the Union line, though hard pressed, stood firm until, the left being driven back, it was nearly enveloped and gave ground, and the Confederates pressed on to an attack on A. J. Smith, who held the second line in reserve. After a short and sharp exchange of fire, Smith's and part of Emory's men made a charge and pushed back the Confederate line. All the reserves were now thrown into action, and the Confederates were routed, driven from the field and pursued until dark. Gen. E. Kirby Smith, the Confederate department commander, says: "Our troops attacked with vigor and at first with success, but, exposing their right flank, were finally repulsed and thrown into confusion. The Missouri and Arkansas troops, with a brigade of Walker's division, were broken and scattered. The enemy recovered cannon which we had captured the day before, and two of our pieces with the dead and wounded were left on the field. Our troops were completely paralyzed and disorganized by the repulse. . . . Our repulse at Pleasant Hill was so complete and our command was so disorganized that had Banks followed up his success vigorously he would have met but feeble opposition to his advance on Shreveport."

Banks had at Pleasant Hill 12,600 men, of whom 150 were killed, 844 wounded and 375 missing. Taylor had 14,300 engaged, of whom about 1,000 were killed and wounded, and nearly 500 missing.

Encouraged by his success at Pleasant Hill, Banks gave orders for a forward movement next morning on Shreveport, and preparations were being made for the march, when General Franklin and other officers dissuaded him from it, and it was decided to fall back to Grand Ecore and unite with the fleet. The retreat was resumed during the night and Grand Ecore reached on the 11th. E. Kirby Smith joined Taylor after the close of the battle of Pleasant Hill, and determined to move against General Steele in Arkansas. Taylor withdrew his infantry to Mansfield on the 10th and 11th, leaving the cavalry, under Green, and Polignac's infantry division of 2,000 men to watch and harass Banks. Upon his arrival at Grand Ecore, Banks intrenched, threw a pontoon-bridge across the river, put part of his force on the other side and waited for the fleet to come down. Porter, with the gunboats and Kilby Smith, with the transports, had arrived at Loggy Bayou on the afternoon of the 10th, where, two hours later, they received news of Banks' misfortunes, and on the morning of the 11th received his orders to return to Grand Ecore. The fleet turned down stream, but it was not to reach Grand Ecore without opposition. On the evening of the 11th Green, who had been left at Pleasant Hill, started with 750 men and two batteries for Blair's Landing, and on the 12th, with about 500 men and three guns, attacked the fleet and transports as they were running down the river. A brisk fight followed, General Green was killed by a discharge of grape from one of the gunboats and his men were driven off, with small loss. The Union loss was 57 killed and wounded. By the 15th all the gunboats were back to Grand Ecore, and as fast as the vessels could pass the bar they made their way to Alexandria, one

gunboat being lost. The fleet having passed down, Banks marched from Grand Ecore on the 22d for Alexandria, and that night bivouacked at Clouterville, 32 miles from Grand Ecore. The march was resumed on the 22d, and on the morning of the 23d, while marching along Cane River, a branch of the Red, the head of the column was checked at Monett's Ferry by General Bee, with four brigades of 2,000 men and four batteries. Bee's position was a strong one on a bluff commanding the crossing, and on the only practicable road to Alexandria, 35 miles distant. At the same time the Confederate cavalry under General Wharton and Polignac's infantry were harassing Banks' rear. General Birge, with his own brigade and Cameron's division of the 13th corps, in all about 5,000 men, crossed Cane River three miles above the ferry, and by a difficult flank march of several miles reached a hill, the occupation of which rendered Monett's Bluff untenable. Birge attacked at 2 P.M., after a contest of two hours carried the hill, and the Confederates retreated and left open the road to Alexandria. The Union loss was 150 to 200 killed and wounded. Banks resumed his march on the 24th, and without further serious opposition entered Alexandria on the 25th. Banks reported that in the 24 days intervening between the march of the army from Alexandria and its return there his own army had marched 400 miles. He had fought several battles, and been successful in all but one, and his losses were 289 killed, 1,541 wounded and 2,150 missing, an aggregate of 3,980. The difficulty of getting Porter's fleet over the shallow rapids near Alexandria detained Banks at that place until 13 May, when he continued his retreat. (See YELLOW BAYOU, ENGAGEMENT AT). Consult 'Official Records' (Vol. XXXIV); Taylor, 'Destruction and Reconstruction'; The Century Company's 'Battles and Leaders of the Civil War' (Vol. IV).

E. A. CARMAN.

SABINE MOUNTAINS, Italy, a branch of the Apennines, near the border of ancient Latium, east of Rome, is a lofty group in the upper valley of the Aternus; the highest summit reaches an altitude of about 4,200 feet.

SABINE PASS, Engagement at. On 6 Aug. 1863 General Halleck informed General Banks, in command at New Orleans, that there were important reasons why the United States' flag should be raised at some point in Texas, with the least possible delay. Halleck's dispatch was by direction of the Secretary of War, and it was understood that the proposed movement was of diplomatic rather than a military character, and intended to prevent European complications. Banks was left to his own judgment how to conduct the campaign, but it was suggested that the most feasible route would be by the Red River to Shreveport. Banks, deeming the Red River route impracticable at that season of the year, fitted out an expedition to make a lodgment in Texas at Sabine City, on Sabine Pass, the outlet from Sabine Lake into the Gulf of Mexico, and the terminus of a railroad penetrating eastern Texas, and making connection with Houston, the capital of the State. General Franklin was put in charge of the advance of the expedition of 5,000 men, and was instructed to land a few miles below Sabine Pass, move upon the Confederate works commanding it, and, if practicable, to seize Beaumont, on the railroad to Houston. Four light-draft gunboats, under command of Lieutenant Crocker, formed part of the expedition, which sailed from New Orleans on 4 September. Franklin disregarded his instructions to land 10 or 12 miles below Sabine Pass, and on Crocker's representation that he could silence the Confederate works in the pass, he and Crocker arranged for the gunboats to make a direct attack upon the works, drive out the garrison, seize or drive away two Confederate gunboats reported on the river and then land the troops. From the army 150 sharpshooters were distributed on the four gunboats. Early in the forenoon of the eighth the gunboats and transports crossed the bar at Sabine Pass, and in the middle of the afternoon three of the gunboats opened fire upon the small fort, mounting eight heavy guns, and held by 44 officers and men. The fire was immediately returned, two of the gunboats were disabled and surrendered and were taken in tow by two small Confederate craft. It was all over in less than an hour. Franklin made no serious attempt to land his troops, but immediately returned to New Orleans, having lost two gunboats, with their 15 heavy guns, nearly 50 killed and wounded and over 200 prisoners, among them Lieutenant Crocker, of the navy. Not a Confederate was hurt. Consult 'Official Records' (Vol. XXVI).

SABINES, sā'bīnz (Lat. SABINI, sa-bī'nī), a people noted in the early history of Rome, whose territory they adjoined. The Sabines were engaged in agriculture and grazing, and from the simplicity of their lives and their physical prowess they obtained a reputation like that of the Spartans for severity of discipline and sturdiness of character. The narrow limits of the Sabine territory made emigration necessary, and probably in this way they came in contact with the growing power of Rome. They fought the Romans with great courage, but were subdued about 290 B.C., and admitted to Roman citizenship, but not permitted to vote in civic affairs. They became merged in the republic and subsequent empire, and were lost to view as a separate people.

SABINUS, Masurius, Roman jurist. He flourished during the reign of Tiberius, and was a pupil of Capito. He was the founder of the school of Sabiniani, and was the author of several works much used and commented upon by later jurists, the most important being 'Libri iii, Juris Civilis,' which is not now extant.

SABLE, one of the fur-bearing animals (*Mustela zibellina*), found in Siberia, Asiatic Russia and Kamchatka, or its American representative (*M. americana*) which differs so little that it is doubtfully named as a separate species. The average length of the sable is about 18 inches, excluding the tail, which is somewhat bushy. The body partakes of the form of the weasels generally, in that it is elongated and vermiform. The fur is smooth, glossy and may be pressed or smoothed in any direction, owing to the mode of attachment of the hairs to the skin. In color it is a rich deep brown, which near the head may exhibit white markings, and frequently assumes a gray tint about the neck. The fur is heaviest during winter, and the dangers experienced by the sable-hunters from sudden snow-storms obliterating the track, or from the inclement cold, can hardly be overestimated. Sables are for the most part captured in traps, but are cautious animals, and their pursuit is attended with much difficulty. They make their homes in dens or cavities in hollow trees, and produce from three to five young at a birth, the young being born in March or April; and their general habits are those of the marten and weasel, but they are more shy and retiring.

Skins of the Russian sable fetch prices in Liverpool ranging from 3 to 10 guineas. The darkest skins are considered to be the finest. About 2,000 skins annually find their way to England. Most of these furs are used in Russia, where about 25,000 are said to be annually collected. When manufactured for linings sable fur may fetch prices as high as 1,000 guineas. The corporation robes of the London aldermen are lined with this expensive material, and the tails of sables are used in the manufacture of artists' brushes. See FUR-BEARING ANIMALS; FUR-TRADE.

SABLE, Cape. See CAPE SABLE.

SABLE ANTELOPE, one of the largest and most handsome of African antelopes (*Hippotragus niger*), of the same genus as the roan antelope, blaubok and others, and like them rapidly approaching extinction, as civilization more and more encroaches upon the plains of southern and eastern Africa. Its coat is a deep glossy black, markings upon the face, the buttock and the under parts being white. The great-ringed horns sweep back from the forehead in a sabre-like curve, and the neck is adorned with a mane. These antelopes went about, in old times, in herds, and were prizes for the sportsmen, while their flesh was excellent to eat. Extensive descriptions may be found in the writings of Gordon-Cummings, Anderson, Baker, Selous, Bryden and other African sportsmen-travelers.

SABLE ISLAND, a low-lying island in the Atlantic, in lat. 44° N. and long. 60° W., 85 miles east of Nova Scotia. It is a chain of sand dunes enclosing a lagoon, and is such a menace to navigation that the government of Canada maintains two lighthouses there. It was formerly 40 miles long and is now but 20, gradually sinking. Upon its sandy ridges grow cranberries and wild grass, and attempts are being made to raise pines and other hardy evergreens. There are sandbanks in the vicinity. The only inhabitants are the lighthouse and lifeboat men attached to the establishment for the relief of shipwrecked persons. The island is known for its breed of hardy wild ponies.

SABOTAGE, sâ-bo-tázh, a method used by labor revolutionists to force employers to accede to demands made on them. It consists in a wilful obstruction and interference with the normal processes of industry. It aims at inconveniencing and tying up of production, but stops short of actual destruction or of endangering human life directly. The practices are varied. The original act of sabotage is said to have been the slipping of the wooden shoe or "sabot" of a workman into a loom, in the early days of the introduction of machinery, to impede production. Some of the more common forms are wasting of materials; telling the exact truth to customers; obeying orders punctiliously, especially on railroads; using of bad materials so as to impair the standing of the employer; placing sand or emery in wheel bearings; loosening screws and nuts; cutting belts; sitting idle at machines; mislaying tools, and any number of petty devices for hindering and delaying production. These methods were found to be more subtly effective by the syndicalists, and have been endorsed also by the I. W. W. (q.v.). Sabotage is conducted secretly, so that the blame cannot be fixed and the criminal law is thus avoided. Many prominent labor leaders consider it a slavish, wasteful and sterile instrument and prefer the strike as a form of direct action. Consult Brooks, J. G., 'American Syndicalism: the I. W. W.' (Chap. XII, New York 1913).

SABOTS, sa-bōz', wooden shoes largely worn by the peasantry of France, Belgium, Holland and some other parts of Europe. They are especially useful in wet weather, and in moist places generally, being well adapted to preserve the feet from damp. Great numbers of sabots have been exported by France to Belgium. In some parts of England, as in Lancashire, shoes with thick wooden soles, but with leather vamps or "uppers," are worn by most of the artisan class. See BOOTS AND SHOES.

SABRE-TOOTHED TIGERS, extinct cats of the family *Machærodontidæ* (or *Nimravidæ*), a group whose remains occur as fossils from the Eocene up to the Pleistocene. They differ from ordinary cats (*Felidæ*) in several anatomical features, having some peculiarities which ally them to the bears, and others recalling existing viverroids, as the foussa (*Cryptoprocta*). They are remarkable for the character of the dentition, which in the earlier genera comes near showing the complete number of teeth, but displays a steady tendency as the family history is followed toward the reduced number possessed by existing cats. At the same time the dentition is often distinguished by the huge size of the upper canines, which in some cases were five or six times as long as the neighboring teeth, and have been justly called "sabre-teeth." These tushes reached their highest development in the genus *Machæodus,* whose species were of very wide distribution, occurring in both North and South America and in Europe. These carnivores were of various sizes, up to dimensions equal to those of modern tigers, and so little different in general from true cats that Cope places them within the *Felidæ*. It began in the Eocene and continued down almost or quite to the Glacial Period, when the type seems to have become extinct because the great canines had overgrown their usefulness and become a hindrance instead of a help in getting a living. They finally became so large that the animal could not open its mouth wide enough to make use of them in biting, and the space between them would admit none but a very small piece of meat to enter, even if a large piece could be torn away. "Even when the mouth opens so far as to allow the mandible to pass behind the apices of the canines," remarks Cope, "there would appear to be some risk of the latter being caught on the point of one or the other canine, and forced to remain open, caus-

ing early starvation.» Other prominent genera in the family are the plantigrade *Dinictis; Nimravus* and *Pogonodon,* with species as large as panthers; and *Hoplophoneus,* with dentition like modern cats. Consult Flower and Lydekker, 'Mammals, Living and Extinct' (1891); Cope, 'Vertebrates of the Tertiary Formation of the West' (in Report United States Geological Survey, Vol. III, Washington 1884); Woodward, 'Vertebrate Palæontology' (1898).

SABRE-TACHE, sā-br-tăsh, a leathern case or pocket worn by cavalry officers at the left side, suspended by three straps from their swordbelt. It came into use when the jackets of cavalry soldiers were too short or too tight to admit of pockets being made in them, but is now rather ornamental than useful.

SAC (săk) **CITY,** Iowa, county-seat of Sac County, on the north fork of the Raccoon River, and on the Chicago, Milwaukee and Saint Paul and the Chicago and Northwestern railroads, about 42 miles west by south of Fort Dodge. It is in an agricultural region where considerable attention is given to raising livestock. The chief manufacturing industries are connected with farm products. The trade is mainly in farm and dairy products, flour and agricultural implements. The educational institutions are the Sac City Institute (Baptist), a high school, public elementary schools and a public library. Pop. (1920) 2,630.

SAC AND FOX INDIANS, also known as **MUSKWAKI,** an Algonquian people called by the French Foxes (*Renards*), possibly because of their having a Fox clan. To themselves they were Muskwaki or red-earth people. When first noticed by the whites they inhabited central Wisconsin. The Ojibwas had driven them from the Lake Superior region and about 1760, being worsted in conflict with the French, they incorporated with the Sac tribe, with whom they have remained so intimately connected as to have been long regarded as one tribe. They are of the woodland type, formerly lived in bark houses and cultivated corn and vegetables. They developed a complex social organization and are noted for their conservativeness in adopting the customs of the whites. Their number at present is about 750. Consult Owen, M. A., 'Folk-lore of the Musquakie Indians of North America' (London 1904), and 'Handbook of American Indians' (Washington 1907).

SAC FUNGI. See FUNGI.

SAC-À-LAIT, săk'ạ-lā, a fish. See CRAPPIE.

SACAJAWEA, sa-ka'ja-wē'a, **SACAGCEWEA, SAHKAHGARWEA,** or **SAHCARGARWEAH** (Minnetarre name *Tsaka-ka-wias,* «BIRD WOMAN»; Shoshone name *Bo-i-naiv,* «GRASS MAIDEN»), American Indian guide of the Shoshone tribe, the only woman to accompany the Lewis and Clark Expedition of 1804–06: b. about 1784; d. Shoshone Agency, Wyo., 9 April 1884. She was betrothed in infancy according to tribal custom, but was captured by the Minnetarres when a child and later gambled away by her captor to a Frenchman named Charboneau, whose wife she became and with whom she was living in the Dakotas when Lewis and Clark reached there. Charboneau and Sacajawea were engaged as guides and spent the winter at Fort Mandan, where Sacajawea's son, Baptiste, was born 11 Feb. 1805. Sacajawea displayed remarkable ability as a guide, threading the way accurately to her own country which she had not seen since she was a child, and gaining the admiration of the expedition for her courage and resourcefulness. On one occasion at the risk of her life she rescued from an overturned canoe the records of the expedition and other light articles of great value to the explorers. She led the party to the camps of her own people 17 Aug. 1805, where she was immediately recognized, her affecting meeting with her brother Cameahwait, chief of the tribe, being described in the journals kept by Lewis and Clark. She was claimed by her betrothed husband, who, however, relinquished his claims upon finding her the wife of another and mother of a son whom she had carried on her back all the way. Here the devotion of the Indian woman procured for the white men food and horses from the Indians, while her shrewd sense and good counsels prevailed over her brother's determination to destroy the whites for the sake of their goods. Finding all her people dead except her brother and the child of a dead sister she immediately adopted the sister's child as her own, and according to the custom of her people never admitted the sister's son to be other than her own. This child, of pure Indian blood, was known as Basil; both children lived and had descendants. Sacajawea accompanied the party to the ocean, which was reached 7 Nov. 1805, and returned with Captain Clark by way of the Yellowstone, which region also she knew well. Upon their return to the Minnetarre country Charboneau refused all inducements to accompany the explorers to civilization, and Sacajawea remained with him. Further mention is made of her and her son Baptiste in Clark's letters, but she then disappears until she was found, an old woman, in the Shoshone Agency. She told a clear and intelligible story, and although illiterate spoke excellent French, which, however, she spoke with less ease in the earlier days of the expedition. She died of old age when about 100 years old. Monuments have been erected to her at Portland, Ore.; Bismarck, N. D., and by the State of Wyoming. Consult 'Sacajawea' in *Journal of American History* (September 1907); 'Journals of Lewis and Clark Expedition' (ed. by Thwaites, R. G., 8 vols, 1904; Schultz, J. W., 'Bird Woman' (1918).

SACBUT, or **SACKBUT,** the word by which translators have rendered the *sabbeka* of the Hebrew Scriptures. The exact form of the sabbeka has been much disputed, but that it was a stringed instrument is certain, for the name passed over into Greek and Latin in the forms *sambukē, sambuca,* and the instrument so called is described by Athenæus as a harplike instrument of four or more strings, and of a triangular form. It is not unlikely that this instrument was introduced among the Jews from the East, since one of the musical instruments most frequently occurring in the Assyrian sculptures answers very closely to this description, and may perhaps be identified with the sabbeka, the name of which is, besides, Chaldaic. Nothing resembling this Assyrian instrument is to be found on the Egyptian monuments or in the sculptures of Greece and Rome. Since the sabbeka was a stringed instrument the rendering sacbut is altogether wrong, since that was, at the time when our translation of the Scriptures was made, the name of a wind-instrument now called the trombone. See TROMBONE.

SACCATON GRASS. See GRASSES OF THE UNITED STATES.

SACCHARIN, săk'ka-rĭn, benzoïc sulphinide, $C_6H_4 \begin{matrix} CO \\ SO_2 \end{matrix} NH$, has attained commercial importance and is manufactured on a large scale in many countries on account of its intense sweet taste, chemically pure saccharin being 500 times sweeter than cane sugar. The compound was discovered in 1879 by I. Remsen and C. Fahlberg during an investigation of the oxidation products of toluene sulphone amide. According to a process outlined in D.R.P. 35, 211, saccharin is manufactured from toluene by treating this with sulphuric acid at temperatures not exceeding 100° C. The product is converted into the calcium salt, then into the sodium salt. With phosphorus trichloride in a stream of chlorine the dry sodium salt yields a mixture of ortho- and para-toluene sulphone chlorides. The solid para compound is worthless as far as the manufacture of saccharin is concerned, but the oily ortho compound will, upon saturation with ammonia, yield toluene-ortho-sulphone amide, and the latter is readily oxidized into saccharin with a solution of neutral potassium permanganate. A more general method for the manufacture of saccharin consists of the treatment of toluene with excess of chlorsulphonic acid at very low temperatures. The reaction mixture is first poured on ice and then cooled for several hours at —20° C. The oily ortho compound is now separated from the solid para compound by filtration; the oil is treated with dry ammonium carbonate, or dry ammonia gas, and finally oxidized into saccharin with a neutral solution of potassium permanganate.

Saccharin is a white crystalline substance which melts with partial decomposition at 220° C. It is readily soluble in acetone, alcohol and ether, sparingly in benzene, toluene and amyl alcohol. Although its solubility in water is not very great — one part in 230 parts of water at 25° C.— the water solution possesses an intense sweet taste. Saccharin behaves like an acid, forming soluble crystalline salts with a number of metallic hydroxides and carbonates. Some of these salts possess the intense sweet taste of the original compound. The sodium salt, $C_6H_4 \begin{matrix} CO \\ SO_2 \end{matrix} NNa.2H_2O$, is the commercial «crystallose,» 400 times sweeter than cane sugar, and being very soluble in water is extensively used as a sweetening medium in preference to the less soluble saccharin.

Saccharin is used as a substitute for cane sugar in the treatment of diabetes, dyspepsia, obesity and in gastro-intestinal infections. According to some authorities the compound is rapidly absorbed and eliminated practically unchanged through the kidneys without producing digestive troubles or toxic effects. On account of its antiseptic properties saccharin has not found universal favor as an artificial sweetener in foods, confectionery and beverages. Saccharinated cake and pastry have been condemned as indigestible foods, and government regulations require that in liquors, syrups and the like the presence and amount of saccharin be plainly declared upon the label.

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SACCHAROMETER, or **SACCHARIMETER,** any instrument used to determine the strength of a sugar solution. One common form is a hydrometer with the stem so graduated as to read per cents of sugar content in solution examined. Another is a form of polariscope devised by Mitscherlich with the scale on which the angle of deviation of the plane of polarized light is read so graduated as to show the percentage of sugar in the solution used. Another instrument of this type is the invention of Soleil.

SACCOPHARYNX, a genus of *Muræniдæ,* with a single species (*S. flagellum*), a deep-sea conger eel, of which only three specimens have been observed; muscular system very feebly developed; bones thin and soft, wanting in organic matter; head and gape enormous; stomach distensible in an extraordinary degree; vent at end of trunk. The specimens known have been found floating on the surface of the north Atlantic with their stomachs much distended, having swallowed some other fish many times their own weight. They attain a length of several feet. See DEEP SEA EXPLORATION.

SACHEVERELL, să-shĕv'ẽ-rĕl, **Henry,** English Anglican divine: b. Wiltshire, about 1674; d. London, 5 June 1724. He was educated at Oxford and in 1705 was appointed preacher of Saint Saviour's, Southwark. While in this station he, in 1709, preached two famous sermons, the object of which was to rouse apprehensions for the safety of the Church and to excite hostility against the Dissenters. Being impeached in the House of Commons he was brought to trial in February 1710, and on 23 March, when the trial was concluded, was suspended from preaching for three years. This prosecution, however, excited such a spirit in the High Church party that it helped to overthrow the ministry of Godolphin, and established the fortune of Sacheverell, who, during his suspension, made a kind of triumphal progress through the kingdom. The same month that his suspension terminated (1713) he was appointed to the valuable rectory of Saint Andrew's, Holborn, by Queen Anne. Of the offending sermons 40,000 copies at least were sold, and of the record of the trial 30,000. Little was heard of Sacheverell after this party ebullition subsided, except through his numerous squabbles with his parishioners. His abilities, even according to writers on his own side, were very slight. Consult Stanhope, 'History of Queen Anne's Reign' (1872).

SACHS, săks, **Bernard,** American neurologist: b. Baltimore, Md., 2 Jan. 1858. He was graduated at Harvard and the University of Strassburg, Germany, in 1882, and engaged as a medical practitioner in New York. He has made a specialty of the study of nervous diseases, regarding which he is a recognized authority. Besides numerous medical monographs he has published 'Mental and Nervous Diseases of Children' (1895).

SACHS, Edwin O., English architect: b. London, 5 April 1870. He was educated at University College School, London, and at the University of Berlin, and engaged as an architect in London in 1892. He has established a wide practice in connection with theatres and public buildings and in 1898 applied electrical power to the working of the stage for the first time in England. He founded the British Fire Prevention Committe in 1897 and organized the first International Fire Prevention Congress in London in 1903; organized Special Fire Survey Force in connection with the European War. He has published 'Modern Opera Houses and Theatres' (3 vols., 1896–98); 'Facts on Fire Prevention' (1902); 'Stage Construction' (1898); 'Fires and Public Entertainments' (1897).

SACHS, Hans, hänts zäks, German meistersinger: b. Nuremberg, 5 Nov. 1494; d. there, 20 Jan. 1576. He was by trade a shoemaker, and followed his business and made verses with equal assiduity. From 1510 to 1515 he traveled over different parts of Germany, practising his craft, according to the custom of German workmen, in all the towns he visited. In the latter year he returned to his native town, where he was admitted as master in his guild. He early attached himself to the Reformation movement, to the spread of which among the *bourgeoisie* he contributed not a little by a poem written in 1523, 'Die wittenbergisch Nachtigall, Die man jetzt höret überall,' in which he hailed with approval the cause of Luther. In 1544 he was with the army of Charles V in France. The productions of Hans Sachs are extremely numerous. In 1536 he estimated the number of his poems at 5,000 or more. Three volumes of his poems were published during his lifetime, and two more after his death. In the 17th century, after the introduction of a more artificial style into German poetry, Hans Sachs fell into neglect, from which he was not withdrawn till Goethe, who had become acquainted with him in his studies for 'Faust,' drew attention to his merit in a poem ('Erklärung eines alten Holzschnitts vorstellend Hans Sachsens Poetische Sendung') which apeared in the *Deutscher Merkur* (April 1776). The best edition of his works is that of Keller and Goetze, and the best selection that of Gödeke and Tittmann in 'Deutsche Dichter des sechzehnten Jahrhunderts' (2d ed., 1883–85). He possessed a fruitful genius and, notwithstanding the rudeness of his language, his poems are distinguished for naïveté, feeling, invention, wit and striking description. Consult Schweitzer's 'Étude' (1889); Goetze's 'Hans Sachs' (1894); Genée's 'Hans Sachs und seine Zeit' (1894), and Drescher, 'Studien zu Hans Sachs' (1891).

SACHS, Julius, German botanist: b. Breslau, 2 Oct. 1832; d. Würzburg, 29 May 1897. He studied in Prague, where he became assistant in botany, and in 1867 became professor of botany at Freiburg. The following year he removed to Würzburg, where in his own laboratory he made extremely important experiments in the physiology of plants. He published 'Handbuch der Experimental-physiologie der Pflanzen' (1865); 'Lehrbuch der Botanik' (1868–74); 'Vorlesungen über Pflanzenphysiologie' (1882–87); 'Geschichte der Botanik vom 16. Jahrh. bis 1860' (1875); 'Gesammelte Abhandlungen über Pflanzenphysiologie' (1892–93).

SACHS, Julius, American educator: b. Baltimore, Md., 6 July 1849. He was graduated at Columbia University in 1867 and later studied at the universities of Würzburg, Berlin, Göttingen and Rostock. In 1872–1902 he was engaged as principal of preparatory schools, and in 1902–17 he was professor of secondary education at Teachers' College, Columbia University, where he has since been professor emeritus. In 1890–91 he was president of the American Philological Association, and he filled that office for the Head Masters' Association of the United States in 1899. Author of 'Syllabus of a General Course on the Theory and Practice of Teaching in the Secondary Schools' (1909); 'The American Secondary School' (1912), etc.

SACHSE, säkse', **Julius Friedrich,** American author: b. Philadelphia, Pa., 22 Nov. 1842. He has been librarian and curator of the Masonic Temple since 1906. He engaged in journalism and has written extensively, his publications including 'The German Pietists of Provincial Pennsylvania, 1694–1708'; 'Horologium Achaz-Christophorus Schissler, Artifex'; 'Justus Falckner, Mystic and Scholar' (1903); 'Pennsylvania: the German Influence in its Settlement and Development'; 'The German Sectarians of Pennsylvania, 1708–1803'; 'The Wayside Inns on the Lancaster Roadside'; 'Old Masonic Lodges of Pennsylvania, Modern and Ancient 1730–1800'; 'The Masonic Correspondence of George Washington,' etc.

SACHSENHAUSEN, zäk'sĕn-how-zĕn. See FRANKFORT-ON-THE-MAIN.

SACHSENSPIEGEL, zäk'sĕn-spē"gĕl, a private collection of legal precepts and legal customs which had the force of law in the Middle Ages in Germany, especially in the north of Germany. One of the six prefaces to the collection mentions one Eyke von Repgow as its author, and this account is generally accepted as true. Its date is supposed to be earlier than 1235. The study of it has been revived in Germany. The best edition is by Homeyer (Berlin 1835–44).

SACKBUT. See SACBUT.

SACKEN. See BUGONIA.

SACKETTS (săk'ĕts) **HARBOR,** N. Y., village, in Jefferson County, on Black River Bay, the inlet through which Black River discharges its waters into Lake Ontario, and on the Rome, Watertown and Ogdensburg branch of the New York Central and Hudson River Railroad. The village is about 10 miles from Watertown, eight miles from Lake Ontario and 170 miles west-northwest of Albany. It has a good harbor, large enough to accommodate vessels of the largest size, and it has steamer connections with several of the lake ports. Sacketts Harbor is one of the oldest places on the northern frontier; in 1809 the *Oneida,* the first United States war vessel, was built here. In the War of 1812 the village was the scene of several engagements and was an important United States naval station. The frigates *Madison* and *Superior,* war vessels, were made here in 40 and 80 days, respectively, from the time the timber was cut. A third warship was nearly completed when peace was restored; the hulk remained in the yard for a number of years. The United States military station, Madison Barracks, is located here. Sacketts Harbor is in an agricultural region, and although it has good water power, there is but little manufacturing. Pop., exclusive of garrison, 868.

SACKETTS HARBOR, Attacks on, in the War of 1812. On the outbreak of the war the United States had only one ship on Lake Ontario, the *Oncida,* carrying 16 24-pounders and commanded by Lieut. Melancthon T. Woolsey. On 19 July 1812, when Woolsey was at Sackett's Harbor, a British fleet of six ships under Commodore Earle appeared with the object of capturing the *Oneida.* Woolsey attempted to escape but, failing in this, anchored the vessel where his guns could rake the entrance to the harbor and mounted on shore the guns from the off side of the ship. At the end of the peninsula he also erected some guns and after an hour's fight compelled the British fleet to withdraw without inflicting any damage. Consult Cooper, J. F., 'Naval History' (Vol. II, pp. 25, 147, 149); Maclay, E. S., 'History of the Navy' (Vol. I, pp. 472–473); Roosevelt, 'Naval War of 1812' (pp. 145, 151).

When Dearborn sent the expedition to York (q.v.) early in 1813, he left Sackett's Harbor in a defenseless condition, the garrison numbering only 400 regulars and 250 volunteers under Gen. Jacob Brown (q.v.). Accordingly on the night of 26–27 May 1813, while Dearborn was preparing to capture Fort George (q.v.), Sir George Prevost embarked about 800 men on the fleet under Sir James Yeo and on 29 May attacked the garrison at Sackett's Harbor. At the first onslaught the volunteer militia fled but when the British reached the blockhouse they were halted by the desperate resistance of the regulars. Meanwhile Brown rallied the fugitive militia and, attacking the British in the rear, compelled them to retreat. The British loss was 259 killed, wounded and missing. During the battle the naval lieutenant in charge of the shipyard, believing the battle lost, set fire to the barracks, burning the storehouses and doing considerable damage to ships on the stocks. Yeo then returned to Kingston where he remained inactive several weeks. Consult Adams, 'The United States' (Vol. VII, pp. 163–171); Armstrong, John, 'Notices of the War of 1812' (Vol. I, pp. 145–147); Maclay, 'History of the Navy' (Vol. I, pp. 481–482); Lossing, 'War of 1812' (pp. 607–613); Roosevelt, 'Naval War of 1812' (pp. 233–234); Wilkinson, James, 'Memoirs' (Vol. I, pp. 582–584, 634–638); Wiley and Rines, 'The United States' (Vol. V, pp. 408–409).

On 19 May 1814 Yeo blockaded the harbor to prevent the exit of American frigates then under construction. Most of the supplies for the ships were at Oswego Falls a few miles away and on 28 May Woolsey attempted to carry these supplies in 19 small boats to Stony Creek and thence overland to the harbor. Yeo captured one of these boats before it reached Stony Creek and sent 180 men in seven small gunboats to capture Woolsey and his men. But the Americans ambushed the British and captured the whole force with their boats. On 6 June Yeo raised the blockade. Consult Armstrong, 'Notices of the War of 1812' (Vol. II, pp. 73–74); Lossing, 'War of 1812' (pp. 789–800); Maclay, 'History of the Navy' (Vol. I, pp. 488–489); Roosevelt, 'Naval War of 1812' (pp. 360–361); Wiley and Rines, 'The United States' (Vol. V, pp. 422–423).

SACKVILLE, săk'vĭl, **Charles,** 6TH EARL OF DORSET, English courtier and poet: b. 24 Jan. 1638; d. Bath, 29 Jan. 1706. He became a wit and roisterer in the company of Charles II, served under the Duke of York in the sea fight with the Dutch in 1663 and is said to have written or retouched on the night before the engagement of 3 June his famous song, "To all you ladies now on land." He succeeded to the earldom in 1677, but did not stand well in the favor of James II, and later became an ardent supporter of William of Orange, under whom he was lord chamberlain of the household from 1689 to 1697, and three times one of the regents during the king's absence. He was a patron of poets like Prior and Wycherley, and Dryden dedicated to him the 'Essay on Satire.'

SACKVILLE, Lionel Sackville Sackville-West, BARON, English diplomatist: b. Cambridgeshire, 19 July 1827; d. Knole Park, Sevenoaks, England, 3 Sept. 1908. He entered the diplomatic service in 1847, was secretary of legation, respectively, at Turin, Madrid, Berlin and Paris, and was Envoy Extraordinary and Minister Plenipotentiary to the Argentine Confederation (1872–78) and to Spain (1878–81). In 1881 he was appointed Minister to the United States, and in 1888 with Joseph Chamberlain and Sir Charles Tupper negotiated the fisheries treaty of that year. In October 1888 he received a letter from one C. F. Murchison, who, representing himself as an Englishman naturalized in the United States, asked for which party he should vote in the ensuing Presidential election. The Minister in reply advised his correspondent to vote the Democratic ticket as favorable to English interests. The Murchison letter was generally regarded as a trap set for the embarrassment of the Minister. His recall was at once asked for, and in default of a prompt compliance with the request the Department of State sent him his passports 30 October. The incident, occurring as it did during a Presidential canvass, was the subject of much discussion.

SACKVILLE, Thomas, EARL OF DORSET and BARON BUCKHURST, English statesman and poet: b. Withyham parish, Sussex, 1536; d. London, 19 April 1608. He was a student in the University of Oxford, but removed to Cambridge, and afterward became a student of the Inner Temple. At both universities he was distinguished for his performances in Latin and English poetry, and in the Temple wrote the last two acts of the tragedy of 'Gorboduc, or Ferrex and Porrex' (1565). Of a poem intended to comprehend a view of the illustrious but unfortunate characters in English history, entitled the 'Mirror for Magistrates,' he finished only a poetical preface (the 'Induction') and one legend of the life of the Duke of Buckingham. The work was completed by George Ferrers and Richard Baldwin (1559–63). He sat in the Parliament assembling 20 Jan. 1558, and in the first two Parliaments of Eliza-

beth (1559–63) after which he traveled. In 1586 he was made a member of the court appointed by Elizabeth to try Mary Queen of Scots. In 1598 he was joined with Burleigh in negotiations for peace with Spain, and renewed a treaty with the United Provinces. On the death of Burleigh he became Lord High Treasurer. In January 1601 he was appointed lord high steward and presided at the trial of the Earl of Essex. On the accession of James I his post as treasurer was confirmed to him and in 1604 he was created Earl of Dorset. He ranks among the most prudent and able of the ministers of Elizabeth, was a good speaker and a still better writer. The tragedy of 'Gorboduc,' the subject of which is a sanguinary story from early British history, is the first example in English of regular tragedy in blank verse. Sackville's share is inferior in literary value to his 'Induction,' called by Sidney Lee the greatest English poem between the 'Canterbury Tales' and the 'Faerie Queene.'

SACKVILLE, Canada, town in Westmoreland County, 95 miles northeast of Saint John, on the Intercolonial Railway. The Wesleyan Mount Allison College is located here. Pop. (1921) 6,625.

SACO, José Antonio, hō-sā' ān-tō'nē-ō sā'kō, Cuban historian and publicist: b. Bayamo, Cuba, 7 May 1797; d. Madrid, Spain, 26 Sept. 1879. He was educated in Havana and in 1821 was appointed professor of philosophy in the Seminary of San Carlos. In 1832–34 he lived in Havana and edited the *Revisita Bimestre Cubana,* but his liberal and anti-slavery principles caused his banishment, though he was afterward allowed to return. He traveled in Europe and in 1840 settled in Paris where he resided for many years. He was elected a delegate to Madrid in 1866 to advocate political reforms for Cuba and in 1878 was elected to the Spanish Cortes. He wrote 'Paralelo entre Cuba y algunas colonias inglesas' (1838); 'Supresió del tráfico de esclavos en Cuba' (1845); 'Ideas sobre la incorporación de Cuba á los E. U.' (1848); 'Historia de la asclavitud desde los tiempos más remotos' (1876 et seq.), etc.

SACO, sā'kō, Me., city in York County, on the Saco River and on the Boston and Maine Railroad, about 15 miles west-southwest of Portland and four miles from the ocean. Four bridges span the river connecting the city with Biddeford and other localities. A fall in the river of about 40 feet furnishes extensive water power. The tide-water extends to the falls. The chief manufacturing establishments are cotton mills, boot and shoe factories, lumber mills, manufactories of belting, brushes and cotton-mill machinery. The city has an extensive coast trade in cotton goods and other manufactures, and it ships considerable farm products. Old Orchard, a popular seaside resort, is in the vicinity. The principal public institutions are Thornton Academy; York Institute, founded in 1866; a public high school and elementary schools, two libraries, one home for the aged, several fine churches and a number of good business blocks. Pop. 6,817.

SACO, a river which rises in the White Mountains in New Hampshire and flows southeast through New Hampshire and Maine and enters the Atlantic Ocean. It is about 105 miles long and drains an area of 1,750 square miles. It is a swiftly flowing stream having a number of rapids and falls, which furnish abundant water power for manufacturing. Great Falls is 72 feet high.

SACRAMENT. See SACRAMENTS.

SACRAMENTALS, certain objects, actions or emblems, instituted or consecrated by Church authority, for the production of spiritual effects through which temporal benefits are experienced by believers. Of such are the sacramental wine, bread or wafer; the rites of dedication, consecration, benediction; the emblem of the Agnus Dei or sacrificial lamb of God, in the celebration of the Mass or the Holy Eucharist. (See SACRAMENTS). Consult Lamburg, A. A., 'Sacramentals of the Catholic Church' (New York 1892); Probst, F., 'Sakramente und Sakramentalien' (Tübingen 1872).

SACRAMENTARIANS, a religious term which at present is applied almost solely to members of the Protestant Episcopal Church in America and the Anglican Church in England and elsewhere, who sustain a "high" view of the efficacy of the sacraments. In past ecclesiastical history it had a wholly different meaning, and was applied to those Reformers who refused to agree to Luther's doctrine of the real presence of the body and blood of Christ in the bread and wine. The Sacramentarian party were the authors of the Tetrapolitan Confession, so called from the four cities of Strassburg, Constance, Lindau and Memmingen, which supported the Sacramentarian doctrines. This confession excluded all idea of a physical presence of Christ's body. The Swiss reformer Zwingli took a similar position on the question of Christ's presence in the Eucharist, and an article prepared by him declaring against the real presence was embodied in the confession of the Helvetic Church. The German Sacramentarians joined the general body of Protestants in resisting Charles V, and became merged with the Lutherans.

SACRAMENTO, Cal., city, county-seat of Sacramento County and capital of the State, on the Sacramento River and on the Southern Pacific and Western Pacific railroads, 90 miles northeast of San Francisco. The city is situated in lat. 38° 33′ N., and long. 121° 20′ W.; and is built on a broad, low plain, 30 feet above sea-level. The streets are wide and straight and cross each other at right angles. Shade trees are abundant. The shops and stores are built of brick and the dwellings mostly of wood. The city is noted for its beauty of environment, is the centre of an extensive agricultural and horticultural section; and has a mild, almost semi-tropical climate. The State capitol building, completed in 1874, at a cost of $2,500,000, stands in a plaza covering 30 acres. There is a United States government building here, the Crocker Art Gallery, building of the Foresters, Odd Fellows, Masons and Fort Sutter (rebuilt), California State Bank, Roman Catholic cathedral, Sacramento Institute, College of the Christian Brothers, California State Libraray (140,000 volumes), Public Library (28-000 volumes), Howe's Academy, Saint Joseph's Academy, Heald's Business College, City Dispensary, Railroad Hospital and numerous churches, schools and charitable institutions.

The city has several daily newspapers and numerous weekly and monthly periodicals. Sacramento is the second manufacturing city in California and has a variety of industries, including flouring and grist mills, foundries and machine shops, canneries, potash works, lumber mills, manufactories for saddlery, harness, furniture, carriage, soap, candy, brooms, sewer and gas pipes, pumps, mattresses and crackers. The repair shops of both railroads are located here, giving employment to several thousand men. The industries of Sacramento represent a capital invested of over $10,000,000, with an annual output valued at over $15,000,000. The city exports immense quantities of flour and grist-mill products to China, Japan and Australia. The city is governed on the commission plan. There are well-equipped fire and police departments. The waterworks are owned and operated by the municipality. The assessed property valuation of the city is about $62,453,-070, which is 72 per cent of the market value. The tax rate is $1.34 per $100 assessed valuation. The streets are lighted by electricity. An annual State fair is held here, and an exhibition building, park and race course are maintained by the State Agricultural Society. The first white settlement on the site of Sacramento City was made in 1839, by Capt. John A. Sutter, a Swiss by birth, but a naturalized American citizen, who obtained a grant of 11 square leagues of land from the Mexican government. In 1841 Captain Sutter built a fort which he called New Helvetia. He took many of the neighboring Indians into his service, collected a few white trappers, and by virtue of his isolated position and the number of his adherents secured influence and importance in the territory. Sutter's Fort, as it was popularly called, was the first point in California settled by immigrants crossing the continent; with the increase of the population the trade and importance of New Helvetia kept apace, and in October 1848 there was an auction sale of lots in the town of "Sacramento," which was first named in the advertisement of the sale. In January 1849 the first frame house was built on the banks of the Sacramento River, and thither the settlement was moved from the fort. The site of the town was originally about 15 feet above low-water mark, and as the river frequently rose to 20 feet, the town was subjected to overflows. In January 1850, in March 1852 and again in January 1853, the city was flooded so that boats were used in going from house to house. After this the lower streets were raised five feet, and a levee was built which saved the city from subsequent floods. On 3 Nov. 1852 a conflagration destroyed 600 houses and other property, entailing a loss of $5,000,000. In July 1854 another fire destroyed property valued at $650,000. The State capital was established here by an act of the legislature on 25 Feb. 1854, but not until 1861 was a capitol building erected. On 3 Feb. 1856, the first railroad was opened between Sacramento and Folsom. In the gold days of 1849–50 Sacramento was the great mart of the mines, the base of supplies and the metropolitan centre of various mining camps. Steamers ran daily to San Francisco and up the river to Red Bluff. The California Stage Company with a capitalization of $1,000,000 ran daily stages to Maryville, Nevada, Downieville, Stockton, Jackson, Mokelumne Hill and other leading towns in the mining district. The city was first incorporated as a town in 1849, and was chartered as a city in 1863. Sacramento in 1860 had a population of 13,788; (1880) 21,420; (1890) 26,386; (1900) 29,382; (1910) 44,696; (1920) 65,857.

SACRAMENTO, a river in California which rises in the northern part of the State, flows south in the valley between the Sierra Nevada and the Coast Range, and uniting with the San Joaquin River (q.v.), both break through the Coast Range, and enter the Suisun Bay, from which the waters pass through a strait into the Bay of San Pablo, and to the Pacific through San Francisco Bay and the Golden Gate. The chief tributaries are the Pitt River, from the northeastern part of the State, and Feather River, which enters the Sacramento about 15 miles above the city of Sacramento. The Sacramento is about 400 miles long; from the source of the Pitt to the mouth of the Sacramento is about 600 miles. The river is navigable for about 270 miles from its mouth, and the Feather River for about 30 miles from the Sacramento. The débris from placer mining has been a hindrance to navigation; large sums have been expended to improve it. The Sacramento Valley is a fertile region, in which are raised large quantities of grain and fruits.

SACRAMENTO SALMON, PERCH, PIKE, etc., local names in California for various fishes caught in the Sacramento River, and more or less widely elsewhere. The salmon is the quinnat (q.v.). The Sacramento sturgeon is the white sturgeon. (See STURGEON). The Sacramento perch is a fish (*Archoplitis interruptus*) closely related to the Eastern rock-bass. (See BASS). It reaches from one to two feet in length, is blackish above, its sides are silvery, with about seven vertical blackish bars, more or less interrupted. It is an excellent food-fish. The Sacramento pike is a chub, from two to four feet in length. (See SQUAW-FISH). The sucker is a species (*Catostomus occidentalis*) formerly of great importance to the Indian population, but little esteemed in civilized markets.

SACRAMENTS. The Latin word *Sacramentum* was in the classical period a judicial and military technical term. The underlying concept seems to be consecration to a divinity, something set apart for that purpose as sacred and inviolable. Thus the term was applied in jurisprudence to the specified sum of money deposited with the judicial authorities by the parties to a suit, and was so designated either because the place of deposit was sacred, or because the sum forfeited by the losing party was used for religious purposes. In military parlance the word signified originally the preliminary engagement entered into by newly enlisted recruits, and afterward the military oath of allegiance which became obligatory after the Second Punic War (Liv. XXII, 38). Later on the term was used to designate any oath or solemn engagement whatever.

Among ecclesiastical writers the word has had various significations. In earlier usage, represented, for instance, by the ancient Latin version of the Scriptures, and maintained even in many passages of the Vulgate (for example,

Eph. v, 32, Rev. i, 20, etc.) it was a synonym of *arcanum*, and corresponded in sense to the Greek word *μυστήριον*, the notion embodied being that of something secret or mysterious, whence also, by extension, it came to denote the sign or symbol whereby hidden things were signified, especially in matters referring to religion. Thus Augustine says: «Symbols when pertaining to things divine are called sacraments.» As certain religious rites of paganism were called mysteries on account of their occult signification known only to the initiated, the equivalent word «sacrment» was naturally adopted by the early Christians to designate their own religious rites and ceremonies, and was used at first more or less indiscriminately with reference to any or all of them. There seems to have been no attempt on the part of early Christian writers to define the sacraments accurately or enumerate them. Thus they speak vaguely now of two, now of more sacraments, at times even restricting the term to the Eucharist as *the* sacrament, and opposing it to Baptism. Nor do we find in their writings any definition of a sacrament more explicit than the rather general notion formulated by Augustine, «a sign of something sacred.» In the literary treatment of this as well as other doctrinal topics analytic precision and systematic classification came gradually with the development of theological thought.

Roman Catholic theologians of the mediæval and subsequent periods understand by sacraments, in the strict specific sense of the word, a definite category of sacred rites or symbols of divine institution, and which in virtue of this institution have the power of conferring instrumentally the grace or sanctity which they symbolically represent. Of these a certain number are allowed to have belonged to the Old Dispensation, being typical of the sacraments of the New Law, but the intrinsic efficiency attributed to them is limited (with, however, certain reserves in favor of the rite of circumcision taken to be the Old Testament type of Christian baptism) to the bestowal, not of internal, but external sanctity, that is, legal purifications, etc. With regard to the sacraments of the New Law, Roman Catholic theologians hold that they are seven in number instituted by Christ (namely, Baptism, Confirmation, Eucharist, Penance, Extreme Unction, Holy Orders and Matrimony), and this enumeration, together with the main points of doctrine concerning the sacraments collectively and individually has been fixed by the dogmatic definitions of the Council of Trent.

The Reformers of the 16th century who professed to retain only such beliefs as were clearly demonstrated from Scripture rejected the doctrine of the seven sacraments, but did not at once agree as to the number to be admitted, some recognizing besides Baptism and the Eucharist, Confirmation, Penance and Orders, while others rejected one or the other or all of these last. As regards the present status of opinion, if we except the High Church section of the Anglican communion, Protestant denominations as a rule recognize only two sacraments — Baptism and the Eucharist.

That the existence of seven sacraments instituted by Christ cannot be proved from the New Testament alone must, of course, be granted, even by Roman Catholic theologians, but they claim that such proof is not necessary, since, according to the fundamental Catholic contention, the New Testament writings do not furnish a complete record of Christ's actions — they are not, unless supplemented by tradition and the voice of the living Church, an adequate criterion of Christian belief and practice. They contend, moreover, that if the Scripture alone is to be held as decisive in the matter, consistency would require that the ceremony of the washing of the feet (John xiii) be counted among the sacraments, since it seems to fulfil all the requisite conditions.

Be that as it may, it must furthermore be conceded, in connection with the appeal to tradition, that no positive proof of the recognition in the earlier Church of seven sacraments, neither less nor more, can be gathered from the writings of the Fathers. An explanation of this silence has been sought in the heretofore widely assumed influence of the so-called *Lex Arcani*, or Discipline of the Secret, whereby the early Christians were, it was claimed, bound to secrecy with regard to their beliefs and mysteries for fear of profanation on the part of the pagans. But apart from the obvious consideration that there could have been no sufficient reason to make a secret of the number seven, especially when we find that things so sacred as Baptism and the Eucharist are currently mentioned, the most competent authorities of the present day, Roman Catholic as well as Protestant, deny the existence of the *Lex Arcani* as a general prohibitive measure. As such it is chiefly a creation of the 17th and 18th century theologians (consult Batiffol, 'Etudes d'Histoire et de Théologie Positive,' Paris, Lecoffre, 1902).* Consequently, others endeavor to explain the silence of antiquity regarding the explicit mention of seven sacraments on the ground that no systematic, synthetic treatment of the subject was attempted by the early writers. Whatever may be the value of this consideration, it is certainly rather strange to find that so late as the 12th century Saint Bernard enumerates no less than 12 sacraments. Roman Catholic theologians, therefore, rely chiefly on the so-called argument of prescription which is formulated as follows: At the time of the Reformation the entire Christian Church, East and West, was in peaceful, undisturbed possession of the doctrine of the seven sacraments. From the fact that then, as now, it was common to both the Greek and Latin communions, is inferred that it must have been held in the Church at a period anterior to the separation of the Greeks in the 9th century. For apart from the antecedent improbability that any doctrinal growth peculiar to the Latin Church would have been adopted by her hostile rival, we do not find, as a matter of fact, that in the various discussions relative to the reunion of the two churches there was ever any difference to be adjusted relative to the number of the sacraments, though matters of seemingly less consequence were often made the object of protracted dispute. A similar line of argument, though less cogent, is pursued with reference to the Oriental sects — Nestorians and Monophysites — who

*For a well meant but quite ineffectual defense of the old view concerning the Discipline of the Secret, consult McDonald, The 'Apostles' Creed.'

separated from the Church in the 5th century. Whence, it is argued: if this doctrine was that of the Christian Church in the 5th century, it cannot be of other than apostolic origin, for the spirit of the early Church was hostile to all doctrinal innovations, as is proved by the history of the great controversies, and she would doubtless have resented any alteration of the original belief in a matter so important and of such a practical character as that referring to the number of the sacraments. It will be noticed that this argument is partly *a priori*, involving the contested assumption, that with regard to the point at issue it was impossible for the Church to have undergone any change of belief.

In the synthesis of theological speculation elaborated by the scholastics, the sacramental system was conceived as an extended application and a consistent carrying out of the great principle embodied in the Incarnation. In this mystery, according to the belief of most Christians, the invisible Godhead, the author of life and grace, was made flesh and dwelt among us, imparting to men through his tangible, human life and ministry that life of the spirit without which salvation is impossible. Hence the idea of conferring and developing the spiritual life through the instrumentality of visible material things ordained to that purpose was recognized as a principle underlying the entire economy of external means of grace in the Church. As regards the seven sacraments the theory is thus systematically worked out in the theology of Thomas Aquinas (1226–74). There is an analogy between the natural and the spiritual life in man. In the natural order man is born; he attains strength and maturity through growth; he is nourished by food; should illness occur he needs medicine; the common good requires the propagation of the race and the supervision of legitimate authority; and, finally, man needs to be prepared for his departure from this world. Now the parallel needs in the spiritual order are provided for through the seven sacraments. Thus, man is born in baptism, strengthened in confirmation, nourished by the Eucharist and cured from illness by penance; the Christian Church is propagated through matrimony, and by holy orders proper guides are provided in things spiritual; and lastly by extreme unction the believer is prepared for his passage into eternity.

While this comparison is ingenious and instructive as a part of a logical coherent system, it cannot, of course, be adduced as a proof that there are precisely seven sacraments, for obviously it was excogitated to fit the case, and had the number of sacraments then admitted been six or eight or more, the analogy would doubtless have been worked out just as satisfactorily. It proves at most that in the 13th century the doctrine of the seven sacraments had been definitely recognized. As regards the effects of the sacraments, it may be remarked that Catholic theology claims for three of them (Baptism, Confirmation and Orders), besides the conferring of grace common to all, the impression upon the soul of an indelible mark or «character.» This effect is produced even when through a lack of disposition on the part of the subject no grace is bestowed, whence these three sacraments, when validly administered, are never repeated. If sometimes in the case of baptized converts, baptism is again administered conditionally, it is only on account of some doubt as to the validity of the rite previously conferred. The proof for the existence of this «character,» which Protestants unanimously reject, is based chiefly on the ancient practice of the Church with regard to the non-repetition of these sacraments, and on certain texts from the works of early writers who express more or less vaguely the doctrine formulated later on by the theologians and the Council of Trent.

The views of the early Reformers concerning the mode of efficiency proper to the sacraments were, no less than those concerning their number, a radical departure from the received Catholic doctrine. According to the latter the sacraments produced their effects *ex opere operato*, by which formula is meant, that whenever the rite is properly administered and no obstacle or indisposition exists on the part of the subject, saving grace is imparted to the soul, by virtue of the rite itself as an instrumental cause, and independently of the dispositions of the minister or subject — at least so far as the essential effect is concerned. This mode of efficiency is sometimes expressed by saying that the sacraments contain the grace which they signify. Not that grace can be inherited in the physical symbols, but that through a divine ordinance it is infallibly connected with their administration.

While Protestant authorities are generally agreed in rejecting this doctrine, there is among them much divergence of opinion when it is a question of determining the nature of sacramental causality. Thus according to the Zwinglian and Remonstrant doctrine the sacraments are not properly a means of grace. «They were not ordained to signify, seal and apply to believers the benefits of Christ's Redemption, but simply to be significant emblems of the great truths of the Gospel.» The Reformed Church holds the sacraments to be a means whereby grace is conferred, but «their efficacy is due solely to the blessing of Christ and the working of His Spirit, and this efficacy is experienced only by believers.» According to the Lutherans the sacraments confer grace in virtue to their own inherent power, but their efficacy resembles that of a sermon; it can act with saving effect only upon believers, and the beneficial efficiency of the rite consists chiefly in animating the faith of the receiver and strengthening his confidence in the divine promises.

To substantiate the *ex opere operato* or direct, independent causality, Roman Catholic theologians adduce certain passages of the New Testament referring to sacramental efficiency, and in which the saving effect is attributed directly to the rite itself as the secondary instrumental cause. Thus in John iii, 5, spiritual regeneration is expressed as a birth of water and the spirit. Similarly Paul asserts that we have been saved «through the washing of regeneration» (Tit. iii, 5), and he admonishes Timothy to stir up the gift of God which is in him through the laying on of hands.

Another argument is based on the very ancient custom of infant baptism, one that was retained by several of the Protestant denominations. If infants are really born again to a

new life by means of the ceremony of baptism, we can scarcely conceive such an effect otherwise than as due to the immediate efficiency of the rite itself. Obviously it is not because the faith of the subject has been stimulated. Neither can the faith of the minister be the efficient cause, since, apart from other reasons, the Church has always maintained the validity of baptism even when conferred by heretics and schismatics — the sacramental rite when properly administered was supposed to possess its own efficiency.

Consistently with this view it has been the constant teaching of the Church ever since the controversy between Pope Stephen and Cyprian in the 3d century, that neither faith nor righteousness is required in the minister of the sacraments for their valid administration. A certain intention, however, is postulated, namely, that of doing what the Church intends to effect by the rite in question. In other words, it is required that the minister intend to perform the rite not in his own name, but implicitly, at least, as a representative of Christ and of the Church. This intention can be extremely vague — in fact, reduced to a minimum — provided the effect intended by the Church be not positively excluded. As is well known, this question of the requisite intention is one of the main points at issue in the controversy concerning the validity of Anglican orders.

Other questions pertaining to the sacraments are of less importance and belong rather to a complete detailed treatment of the subject as found in the ordinary handbook of theology.

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REV. JAMES F. DRISCOLL, S.S., D.D.

SACRED HEART, Brothers of the. See ORDERS, RELIGIOUS.

SACRED HEART, Ladies of the. See ORDERS, RELIGIOUS.

SACRED HEART, League of, or APOSTLESHIP OF PRAYER IN LEAGUE WITH THE SACRED HEART OF JESUS, a pious association whose object, the glory of God and the salvation of souls, is expressed by its motto, "Thy Kingdom Come." The association was founded at Vals, France, on 3 Dec. 1844, the feast of Saint Francis Xavier, by Father Francis Xavier Gautrelet. The director-general of the League is the father-general of the Society of Jesus, and the principal seat or centre of the association is established at Toulouse. There are also diocesan directors and local directors for every centre. Promoters, who assist in extending the work of the association, are appointed by the local directors. The names and addresses of all the members of the association are kept on record. The number is so great in many centres that the card catalogue system is used. The number of local centres in the world is more than 62,500, and in these centres there are registered over 25,000,000 associates or members. The directors of these local centres are in communication through their diocesan directors and 37 periodicals, called *Messengers of the Sacred Heart,* with the general director. The *Messenger of the Sacred Heart* is published in 22 languages; 6 of the 37 are in English and 6 in Spanish. Other languages in which it is published are German, French, Albanian, Breton, Bohemian, Chinese, Catalonian, Croatian, Flemish, Dutch, Hungarian, Italian, Malabar, Indian, Polish, Portuguese, Slavonic, Hindustani, Arabian and Greek. There are about 5,000,000 members in the United States. In addition to the league periodicals, another most important means of communication is the leaflets distributed each month by the promoters to all the members. The leaflets give the "General Intention" for which all are to pray and work during the month, and supplement the *Messenger* in suggesting ways and means of uniting with the efforts of the missionaries throughout the world for the conversion of souls. Consult 'Handbook of the Apostleship of Prayer'; *Messenger of the Sacred Heart* (New York); Ramière, 'Apostleship of Prayer' (1870).

SACRED HEART OF JESUS, Feast of the, a feast celebrated by the Roman Catholic Church the first Friday after the feast of Corpus Christi. This feast, originated in the latter part of the 17th century, as the special and formal devotion to the Heart of Jesus, owes its origin to Marguerite Marie Alacoque, a French nun of the Visitation Order. Her biographers relate that the Lord Himself appeared to her and gave her instructions regarding the devotion. Many in the Church had practised devotion to the Sacred Heart of Jesus from the time of the Crucifixion, as Cyril, Cyprian, Tertullian, Basil, Ambrose, Saint Francis of Assisi and others, but the devotion was not general nor popularly advocated until the time of Marguerite Marie Alacoque. Consult Gallifet, 'The Adorable Heart of Jesus'; Tickell, 'Life of Blessed Margaret Mary Alacoque'; Nillis, 'De Rationibus Festorum Sacratissimi Cordis Jesu et Purissimi Cordis Mariæ.'

SACRED MONKEY, any of several apes, monkeys and baboons regarded as venerable by barbarous people in various periods and regions. See APE; BABOON; LANGUR, etc.

SACRED MUSIC. See ORATORIO.

SACRED ORDER OF SIAM, The. See ORDERS, ROYAL.

SACRED TREASURE, Order of the. See ORDERS, ROYAL.

SACRIFICES, originally a religious act, which in primitive ages brought the gods and their worshippers into contact, undergoing various changes in the historical development of nations and religions. It is difficult to define the real nature of sacrifice or give its exact origin, because data from ancient eras are few and vague. One may indulge in more or less curious speculation from our present point of view, with endless theories of the latter-day anthropologist, according to each critic's predilection, but the practical definite results are limited. It would seem that the more helpless and ignorant early mankind, the more numerous and approachable the deities. In fear at their terrible might,— everything in the heavens and on the earth being attributed to them — heat and cold, storm and calm, sickness and health, riches and poverty, victory and defeat, it was necessary to win their favor and secure their pardon, if the shadows and the burdens were ever to be removed. Hence arose offerings and sacrifices, accompanied by prayers. The differences among these deities and their potency in different places were all-powerful in framing the name of the god, the nature of the sacrifice and the character of the prayer or hymn.

In Babylonia.— The cult and ritual of the Babylonians and Assyrians throughout the periods of their history from about 3000 B.C. to Khammarabi (2250 B.C.) and then from the Assyrian period (2000 B.C.) to the fall of Nineveh (606 B.C.) and from Nabopolassar to the conquest of Cyrus (539 B.C.) including sacrificial offerings in profuse quantities. Their religion, with astral theology as its basis, gave rise to a remarkable system of gods, large and small, each with its assigned position in the pantheon. Popular tradition from primitive ages combined with the speculation of the schools were the streams of influence. Incantations, omens and hymns accompanied the offerings and were embodied in a system that was partly astronomical and dealt with divination through the liver of sacrificial animals, while libation, ritualistic purifications and various symbolical rites were duly employed. Yet the ethical growth was not to be mistaken, as well as the profound influence exerted on the ancient world, Semite, Greek, Roman, as late as the Gnostic, in Prof. Morris Jastrow's opinion. To particularize as to sacrifice, cattle and agricultural products were offered as in Israel, but with other vegetables. For blood sacrifices, lambs, sheep, goats, bullocks and gazelles were included, male as a rule, the sacrifices being boiled or burnt. It was voluntary, chiefly on public occasions and at festivals. Often daily sacrifice was made. The sacrifice in general is to be regarded, in the opinion of Professor Jeremias, as a kind of tribute from "earth to her overlord" to propitiate the deity in its various manifestations, with the thought of expiation as not distant. The Babylonian had no conception of a religious community, so ingrained in Israel; and while similarities with the Babylonian can be traced in the Jewish system the differences were vital. Even Jeremias, with all his gifts of scientific research, with its defects of over-imagination, has to concede this point.

Ancient Egypt.— The vast number of deities in predynastic Egypt and later ages, local, cosmic, minor and demons, arranged at times in triads, mother, father and child, like the Babylonians, amazes the modern inquirer. It is not easy to understand the religion of the old Egyptian, although the sources are many. On the temple inscriptions offerings to the gods of every class and character are very frequent. They are painted on the walls, columns and most parts of the buildings. After the king, priest and soldiers were next in rank; he presided in the temples and when present had the right to offer sacrifices. This gave special weight to the sacrificial cult. The numerous deities are recognized by different forms or hieroglyphic legends over them. According to Arab historians, it was a primitive custom to sacrifice annually a virgin to secure a plentiful Nile inundation. As a rule in the daily cult slaughtered oxen and geese were in the main sacrifices; burnt offerings were to come later. In the final stages animal worship was revived, with sacrificial rites that aroused the mirth and scorn of contemporary Greek and Latin authors, despite the fact that Egyptian cults found ready lodgment in the great centres of the Roman Empire.

India.— The sacrificial system as practised in ancient India is told with much exactness in the *Brahmanas,*— a Sanscrit term given to a body of prose writings appended to the Vedic text collections. Such detailed explanations were required as sacrifices were more and more elaborated and each ceremonial, however insignificant, had a mystic sense of its own. Here, too, one finds a double current of interpretation, one by the younger and one by the older school of expositors, while the ceremonial manuals give an even more minute description. Sacrifices were of two kinds — meat offerings, consisting of oblations of milk, butter, cereals, or flesh, or of oblations of the juice of the same plant. Three sacrificial fires were set up by each householder; no one national altar existed as in old-time Israel. There were also new and full moon offerings, oblations at the beginning of the three seasons, first fruits, animal sacrifice, day and evening milk offerings. Of a more complex nature were the Soma-sacrifices at important state functions, at which at least three animals were sacrificed and many hecatombs of victims. Each detail has given rise to the most elaborate interpretation, in which the ritualistic theologians delighted, but which here need not be further enlarged upon. In post-Vedic times, with distinct changes in religious beliefs and the rise of new sects, animal sacrifices gradually declined, almost entirely to disappear. Among the Saktas, whose chief seat of worship to-day is Bengal, Assam and Behar, animal sacrifices, usually one or more kinds, continue, the flesh being cooked and served to guests at the ceremony. Some adherents use cocoanuts or pumpkins instead of animals.

Greek and Roman.— The material for describing sacrifices among the Greeks and Romans is very meagre, in the absence of the elaborate codes which have been preserved by other races. In their literature the heroes are treated like gods and the gods like heroes, with a familiarity which is typical. In the Hellenic world numerous were the deities, the degree of veneration varying, however, with the locality. The gods immigrated as their votaries wandered, although the inherited ritual, methods of propitiation and the name of the god would be continued, even if subjected to change. In the Eleusinian mysteries, for example, the gods were actors performing certain rites — the Homeric hymn to Demeter which celebrates the cult dates from the close of the 7th century B.C., if not earlier. On the third day sacrifices, comprising the mullet fish and barley cakes, were offered with special rites.

In the lack of a priestly caste, a sacrificial system was not nationalized. The legendary sacrifice of Agamemnon's daughter, Iphigenia, a favorite in literature, to appease the offended Artemis, only illustrates the barbarism of the primitive cult before it had been modified by the Hellenic spirit. According to the Spartans the human sacrifices originally offered to the goddess were abolished by Lycurgus, who substituted the flogging of youths. The Athenians used to practise human sacrifice at periods of national calamity, selecting for that purpose two from a number of criminals only kept for such a contingency, one for the men of the city and one for its women, who were both stoned to death outside the town to avert all danger. The Romans, always open to foreign religious influence, now the Etruscan, now the Greek, now the Egyptian, brought the conquered gods to Rome when they destroyed the cities of the enemy. In its earliest period when Fetichism developed into Animism, ritual played a great part in the Roman religion, and exactness was necessary in the character of the offerings — male victims to male deities, and female to female divinities, white to the gods above, black to the gods below. Special gods demanded special sacrifices, but mere rustic deities were given milk and millet cake, not blood offerings. In later ages when Rome was transformed into a spacious empire religious cults were many and human sacrifices grew. In the Saturnalia at Rome a human victim was slain annually, until the practice of human sacrifice was wholly interdicted by Theodosius toward the end of the 4th century.

In the Old Testament.— The sacrificial system as laid down in the book of Leviticus has aroused considerable inquiry and criticism. It has been assumed that the entire plan was adapted by the law-giver, at the divine command, to the character and condition of the Israelites, just emancipated from Egyptian serfdom, that it was a concession to their state of civilization at an era when cotemporary nations employed sacrifices as the expression of their sense of religion. But long before the Exodus data as to sacrifices abound in the Pentateuch. They are mentioned in connection with Cain and Abel, with Noah after the Flood, frequently with the Patriarchs. The offerings were vegetable or bloodless and animal or blood-giving, and in one instance Abraham's faith was tested when the command came to sacrifice his son. In those early ages, too, the altar was of earth or of unhewn stones and could be placed anywhere. Hence it was no sudden or startling innovation when Moses developed sacrifices, which in Egypt had been restricted to the paschal lamb, into a national religious system. The reform consisted in the limitation of sacrifice to a special place and to a special group of sacerdotal agents. According to the law the legal place for the offerings was "before the door of the tabernacle" (Ex. xi, 6), before Yhwh (Lev. iii, 1, 7, 12; ix, 2, 4, 5) and afterward in the Jerusalem Temple. The Biblical records disclose many violations of this law, which aroused the earnest rebukes of the prophets. Shiloh, Shechem, Mizpah, Gilgal, Hebron, Beer-Sheba, Beth El witnessed popular assemblies and sacrifices. Besides private sacrifices in individual homes, Solomon, not a priest, offered oblations while kings, priests and a class of prophets disobeyed the law's injunctions and offered to foreign idols, not disdaining human victims. Nor did the genuine national prophets — men of the type of Isaiah, Micah, Amos — show enthusiasm for the sacerdotal worship so readily abused by the people and their leader. On the other hand, passages occur in the Psalms and prophets that allude to the reinstitution of the sacrifices which form so large a portion in Ezekiel's forecast (Ezek. xl–xlviii). It can thus be seen how difficult the subject from the historical point of view. Many theories have arisen in consequence, which fail to satisfy. The Mosaic system of sacrifice, as set forth largely in Leviticus, is clearly narrated. Divided into bloodless and blood-giving offerings, so far as their nature, vegetable or animal, is concerned, they are further classified, according to the occasion and the worshipper's feelings, into burnt-offerings, thank or praise offerings, sin or trespass, purifying offerings. They also could be regarded as voluntary or free-will, compulsory or obligatory offerings. Animal offerings were usually accompanied by libation of wine and a drink offering. While the sacrificial animals demanded were of the clean class, in the data some of the animals specified were not of that type, as bullock, ox, cow, calf, sheep, lamb, goat and kid were alike included. Fishes were wholly excluded: fowls, turtle doves and pigeons were acceptable under certain conditions, for example, from the poorer people. As for the bloodless sacrifice, these included flour, wine, oil, with frankincense and salt as additions; rarely honey and leaven were used. Animals to be sacrified were to be perfect — mostly a male was required, none were to be less than seven days old, first born males to be killed within the first year, mothers and young not to be slain on the same day, some offerings to be more than a year old, the animal, too, was at times one that had done no work nor borne any yoke. First fruits offering of corn was to be of the finest quality. Before sacrifice "sanctification" was necessary, through cleansing of the worshipper. As the blood represented the life or soul, the priest took special care to receive it and sprinkle it "round about on the altar" or on its parts. Certain oblations were eaten by the priests alone in the sanctuary's court; others by the priests and their families in any "clean" place; while the Israelite who offered had to eat his share, within an appointed and limited time, with his family and guests in the city where the sanctuary stood. This completes, without further particularizing, a summary of the Mosaic sacrificial system, whose ethical purpose was, as is proved by the Hebrew word for sacrifice, *Korban*, from the root "to bring near," to bring the worshipper or offerer in closer communication with the Almighty, the oblation or sacrifice evidencing his readiness to some loss and to show his sense of gratitude or penitence.

Rabbinical View.— With the final destruction of the temple and the passing away of the national sacrificial system, the early rabbis in their utterances emphasized the ethical spirit at the basis of the old order and told how the substitute for altar and offering was close at hand in the individual's daily life and character.

In this respect their view was that of the great national prophet leaders of Israel centuries before as well as that of the law itself. It must not be forgotten, also, that sins which concern persons and can be grouped largely under the heading of moral law "could not be atoned without proper restitutions," as Schechter notes in his 'Rabbinic Theology' (p. 196). The leading rabbinic authors unite in similar assertions. Maimonides, the most prominent rabbi of the Middle Ages, in his famous 'More Nebuchim,' shows how even sacrifices in their very nature were secondary as was declared repeatedly by the chief prophets, who laid more weight on inner than outward worship. The formalism of the law had its useful purpose but it was to be subordinated to character and good deeds. Prayer became equivalent to sacrifice. Even if the maimed and defective were rejected at the altar, the broken-hearted are accepted by God. The altar of the home is equal to the altar of sacrifice. "Dead bodies do not render unclean, nor does water make clean; it is the life that gives the real answer to the cry of religion" — was the declaration in effect of Johanan ben Zakkai, in the era of reconstruction after the fall of Jerusalem. The entire trend of rabbinic thought to our day, with but few exceptions, in many an apt statement, anecdote or decision stresses the subordinate character of ritual sacrifices, which were a concession to their age, to pass away as the people grew in spiritual power, although the loss of national independence had to occur to instill the needed lesson.

The Germanic Tribes.— Sacrifices formed a central institution among the early Germans and offerings varied from a gift of milk or flesh or grain carried out to a grove or set in the house corners to human sacrifices. After harvest certain animals were slain and a great feast was celebrated, while the priest swept out the temple precincts with the sacred broom, being careful not to breathe, while within, running outside to draw a fresh breath. Prayers were recited for a bountiful crop, as a great cake was laid upon the altar. In family worships, offerings of milk, honey, fruit and flowers were made. Blood was "the savor and charm" of sacrifice which was conducted with much pomp. It was caught in vessels or in a pit as the victim was led thrice about the altar and killed by the altar stone, amid festal song, and was sprinkled over the sacred trees, altar and walls of the holy place. Entrails, heart, liver and lungs were devoted to the gods — the rest was devoured by the people. The favorite animal for sacrifice was the horse; ox, boar, ram and cock, all males, were also accepted, white animals being preferred, but black were also chosen. Human sacrifice, too, was not disdained. The chain of evidence reaches from Tacitus to the borders of the Middle Ages. "In old Scandinavian legend," according to Gummere, "the old ferocity lingered longest." Captives, criminals or slaves furnished victims for the sacrificial altar, as illustrated by the Viking practice to redden the keel, at the launching of the new ship, by the victim's blood. The marked love of human sacrifice is proved by the Cimbrians in Italy, the wholesale sacrifices among battling German tribes and the emphatic testimony of Tacitus in his 'Germania.' Gummere relates ('Germanic Origins,' p. 464) that in 1843 when a new bridge was to be built at Halle, the people vainly insisted that a child should be walled into it to insure good luck.

In Other Lands.— How the Gauls favored human sacrifice is shown by Julius Cæsar who writes "heaped mounds" would be met in Gaul, which were places of sacrifice. A huge image in the form of a man or a deity would be erected all hollow within, into which human victims would enter and then be set on fire. In Africa in the last century a king of Ashanti, wishing to secure the favor of the gods for his palace, had 200 girls put to death and their blood mixed with the mortar for the new edifice. In Mexico where human sacrifices were very common the rain god was propitiated by the sacrifice of children and to ensure a good harvest men and children were sacrificed to the spirit of corn. A certain mimicry of sacrifice is illustrated by the Mexican offering of a puppet of dough in the form of a man, while the maiden sacrifice to the Nile was an image of mud formed on the banks of the river. Not many years ago hundreds of human victims were offered on the west coast of Africa, where various forms of sacrifice existed. Among the American Indians sacrifices were not so common — the Pawnees and the Iroquois were addicted to such practices. Some curious resemblances to the Mosaic sacrificial systems have been found in the religious customs of the Aztecs and Latin-American races in general.

Kinds of Sacrifice.— A number of recent scholars, taking the initiative from Robertson Smith and Wellhausen, trace sacrifice to primitive forms of religion, connected closely with totemism, although it is difficult to derive what appears to be a universal tendency from so narrow an origin. In the evolution of sacrifice, they distinguish various kinds, for instance, the communal, where a festal meal is shared in common by the god and the worshipper; the honorific, which consists of gifts and libations in honor of the god as if he were an earthly ruler; the piacular, when with consciousness of having done wrong and having brought upon oneself some stain or reproach, an offering is made to atone for the wrong or to cleanse from the impurity, as if the gods were estranged and angry; the mortuary, where, after a death, offerings, especially of human beings, are made as guides or companions in the other world, or as furnishing strength to the dead by the blood of the victim; human, as in primitive cults when human victims are offered to rivers, in the redemption of the first born and as proved by the early law of blood revenge. Such theories, however, are hardly held as convincingly as a few decades ago. The scattered evidence in their favor is not always trustworthy and may be at times susceptible of other meanings.

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SACRILEGE, the act of violating or profaning any sacred thing or any place that has been dedicated to the service of God, as a church or a chapel; in popular usage it means breaking into a place of worship and stealing therefrom. Another meaning of sacrilege is the alienating to laymen or to common uses, of what has been dedicated, appropriated or consecrated to religious persons or purposes. As thus understood, sacrilege is an offense triable by ecclesiastical courts. In the Roman law robbery of churches was, under the Justinian Code, punishable with death. It was formerly a capital crime in English common law also, but by the statutes 24 and 25 Victoria burglary of churches is treated simply as burglary, and theft of sacred things from sacred places as larceny. Neither in the statutes of the United States nor in those of any of the individual States of the Union is sacrilege treated as a crime in any way different from common burglary or larceny. Consult Spellman, 'The History and Fate of Sacrilege.'

SACRISTAN, the original of the name «sexton,» which is an abbreviation of sacristan, the former title being still retained in some churches. The sacristan is an officer in a church whose duty it is to take care of the church and all belonging to it, the sacred vestments and utensils, etc., and to prepare whatever may be required for the sacred offices.

SACRISTY, in the ancient Church a building attached to the basilica and consisting of three parts: (1) The reception-room, in which the bishop was received by the clergy and also gave audiences. It was in this room at Milan that the Emperor Theodosius asked absolution of Saint Ambrose. (2) The sacristy proper in which the sacred vessels and vestments were kept for immediate use; here the officiating ministers robed themselves for divine service. (3) The chamber in which office books, vestments and church plate not in present use were kept. In many modern churches the sacristy is called the vestry, and consists of but one room.

SACROBOSCO, săk-rō-bŏs'kō, **Johannes de** (John of Holybush, Holywood, or Halifax), English mathematician and astronomer: b. Halifax, Yorkshire; d. Paris, 1256. He entered the University of Paris in 1221, afterward becoming a professor there. His most celebrated work is a treatise, 'De Sphæra Mundi,' a paraphrase of a portion of the Almagest (q.v.), of Ptolemy (q.v.). It was printed in 1472, and was afterward frequently reprinted, with the additions of able mathematicians. He was also the author of a treatise, 'De Anni Ratione, seu de Computo Ecclesiastico'; a work on arithmetic, bearing the title 'De Algorismo,' which is one of the earliest treatises on the subject in which the Arabic numerals are used. It was printed at Paris in 1498, with the 'Commentary of Petrus Cirvillus.'

SACRUM, the sacred bone (*os sacrum*), a compound triangular bone situated at the lower part of the vertical column (of which it is a natural continuation), and wedged between the two innominate bones so as to form the keystone to the pelvic arch. In man it consists of several vertebræ with their bodies and processes consolidated into a single bone. Its anterior surface is concave from above downward and from side to side. The posterior surface is convex, and presents in the middle vertical line a crest, formed by the fusion of the spines of the vertebræ, of which the bone is composed. The last sacral vertebra has, however, no spine, and the termination of the vertebral canal is here very slightly protected. In the female the sacrum is broader than in the male. The sacrum of man differs from that of the lower animals by its greater breadth in comparison with its length. See ANATOMY; OSTEOLOGY; PELVIS; SPINE.

SACY, să-sē, **Antoine Isaac,** BARON SILVESTRE DE, French Orientalist: b. Paris, 21 Sept. 1758; d. there, 21 Feb. 1838. Obtaining a thorough acquaintance with the Greek and Latin classics, he studied Hebrew, Syriac, Chaldee, Samaritan, and then Arabic and Ethiopic. To these he added a knowledge of the principal European languages, including Turkish. Later he mastered Persian. During the Revolution he withdrew to a short distance from Paris, and lived unmolested, though his attachment to monarchy was well known. In 1795, when the Convention established a school of Oriental languages, De Sacy was appointed professor of Arabic, and was allowed to retain this situation notwithstanding his refusal to take the oath to the new Constitution. Bonaparte made him professor of Persian in the College of France (1806), and afterward bestowed upon him the title of baron (1813). In 1808 he was elected by the department of the Seine into the legislative body; but took no part in the debates till 1814, when he voted for Napoleon's deposition. In 1815 he was appointed rector of the University of Paris, and shortly after member of the commission for public education. While officiating in these capacities he formed around him a circle of scholars, by which he became indirectly the teacher of all Europe. He took a prominent part in founding (1822) the Asiatic Society of Paris, of which he was president; and it was by his recommendation that professorship of Chinese, Sanskrit, Manchu and Hindustani were established in the capital. In 1832 Louis Philippe raised him to the peerage and made him, after Remusat's death, which took place in this year, conservator of the Oriental manuscripts in the royal library. Among his works may be mentioned 'Principes de grammaire générale' (1799); 'Grammaire Arabe' (1810), and 'Chrestomathie Arabe' (1806); 'Expose de la religion des Druses' (1838); 'Calila et Dimma' (1816).

SADDLE, a seat for a horse's back, contrived for the safety and comfort of the rider. In early ages the rider sat on the bare back of his horse, but in course of time some kind of covering was placed over the back of the animal. The modern riding saddle consists of the tree, generally of beech, the seat, the skirts and the flaps, of tanned pig's skin, and the construction and weight vary according to the purposes for which it is to be used. Among the varieties are racing saddles, military saddles, hunting saddles and side saddles for ladies. The name saddle is also given to a part of the harness of an animal yoked to a vehicle, being generally a padded structure by means of which the shafts are directly or indirectly supported. It is further applied to the support of a rod in machinery or of a spar of a ship.

SADDLE MOUNTAIN, Mass., the chief group of the Taconic Mountains, in the northern part of Berkshire County, four miles southeast of North Adams, and containing Greylock Mountain, the highest peak in the State, 3,535 feet in altitude.

SADDLE REEFS. During the process of folding an anticline the beds at the crest or apex of the fold sometimes tend to open or separate just as a pack of cards might do when bent sharply. If these openings become filled with mineral matter they form a special type of veins which are known as saddle reefs because of their saddle shape. Certain veins of the Nova Scotia gold field and of the Bendigo gold field in Australia are of this type.

SADDLEROCK OYSTER, a large and favorite kind of oyster originally obtained from a reef known as Saddle Rock near Norwalk Harbor, Connecticut. The supply was exhausted early in the last century, but in the first attempts at artificial cultivation of oysters (q.v.) in the eastern part of Long Island Sound many small «seed-oysters» were derived from that district, and so the name continued until it became a market term about New York for large and well-shaped oysters mostly sold to be eaten raw.

SADDUCEES, a sect or party of the Jews during the last three centuries preceding the fall of Jerusalem and the end of the old Jewish state (70 A.D.). The history of the party and the facts as to its constituency, beliefs and practices are only imperfectly known. The statements in Josephus and the New Testament, our most important evidence, are not altogether satisfactory. The New Testament writers may have been indirectly influenced by Pharisaic prejudice, while Josephus, writing to please and interest Greek and Roman readers, limits himself to a few somewhat general and not altogether consistent observations. In the New Testament the Sadducees are linked with the Pharisees as opponents of Jesus (Matt. xvi, 1, 6, 11, 12, etc.); they are said to have denied the resurrection of the body (Matt. xxii, 23ff and parallels), also the existence of angels or spirits (Acts xxiii, 8). As influential priests and members of the Sanhedrin the Sadducees officially opposed the early preaching of the Apostles (Acts iv, 1; v, 17). They sat side by side with Pharisees in the Sanhedrin or Supreme Council of Judaism (Acts xxiii, 6ff), although the two parties were hostile to each other.

Josephus ('War,' ii, 8, 14; 'Ant,' xiii, 5, 9; 10, 5f; xvii, 2, 4; xviii, 1, 2f; xx, 9, 1) tells us that the Sadducees did not believe in fate (i.e., Providence) nor in the immortality of the soul. They emphasized human free will and responsibility and were more austere and inclined to severity in judgment than were the Pharisees. They rejected tradition and held the written law alone to be authoritative. They belonged mainly to the more wealthy and aristocratic circles and were not influential with the mass of the people. Josephus, doubtless, knew more about the Sadducees than he set down in his writings. It must be remembered that the evidence of both Josephus and the New Testament holds good mainly for only the very last period of Jewish history when these Sadducees were only a shattered remnant of a once great and powerful party. There is no trace of any distinct parties in post-exilic Judaism until about 180 B.C. when the close contact with Hellenism consequent on the Seleucid supremacy over Palestine, led to an ardent Hellenizing propaganda and consequently to a cleavage of the Jewish community into two factions, the conservative and the radical or Hellenistic. But it is a mistake to identify the Sadducees with the latter, who were willing to sacrifice even the law itself in favor of conformity to Greek ideas and practices. The conservatives stood for steadfast loyalty to the law and Jewish customs and prejudices. But within the conservative ranks — which comprised the majority of the people — two tendencies were operative. Some, with loyal acceptance of the law and reverence for it as the supreme religious authority, were content with the Law as written. They opposed an accumulation of traditional interpretation as authoritative. Dogmas not explicitly taught in the Law might be refused assent. On the other hand were those who sought to make the Law ever more comprehensive and universally applicable through exegesis or interpretation. Such interpretations became an ever-enlarging body of *tradition* as binding as the Law itself. This was the party of the *Scribes* — ardent students of the Law — while the other tendency was mainly represented by the priests and aristocracy. The scribal position was essentially that Israel was fundamentally a *church* — a religious organization; the opposite position allowed full room for the conception of Israel as a political entity — a nation among the nations of the world. In the reorganization of the Jewish state under the Asmonean priest-princes (142–63 B.C.), the party of the scribes became definitely organized as the Pharisees. The group or party opposed to the Pharisees were known as the Sadducees, probably because so many of the Zadokites (i.e., the priestly aristocracy, cf. Ezek. xliv, 15f.) were among its influential members. There is no evidence, however, that these were so strictly organized as was the case with the Pharisees (q.v.). In general, the Asmonean rulers were inclined to favor the Sadducees. The Pharisees thus became the party of opposition.

The non-priestly aristocracy also generally sided with the government, that is, were counted as Sadducees. The numbers of this generally patriotic, conservative party were sadly diminished in the civil strife preceding the Roman occupation (63 B.C.) and in the wars between Herod and Antigonus, the last Asmonean prince. Its representation in the Sanhedrin was reduced and its hold on the people greatly dimin-

ished. In Herod's later years the party seems to have bettered its condition but it never again recovered its earlier power and influence. As a party it ceased to exist with the fall of Jerusalem, 70 A.D., and the complete disorganization of Judaism that ensued. The view advocated above is somewhat different from the traditional one which takes the Sadducees to have been, as a party, somewhat irreligious, inclined to Hellenism, worldly and with little reverence for the Law and sacred things in general. That some Sadducees were such is probably true, but it certainly is not correct to so characterize the party as a whole.

The Sadduciac type of thought is represented in Jewish literature by such works as Ecclesiastes in the Old Testament, by Ecclesiasticus and 1 Maccabees in the Apocrypha, and possibly by the Testaments of the XII Patriarchs and the Book of Jubilees in the Pseudepigrapha. A most interesting Sadduciac work, hitherto unknown to modern scholars, was recently discovered in the Cairo genizah by Dr. S. Schechter and published by him (Oxford 1910) under the title 'Fragments of a Zadokite Work.' In this we have evidence of the existence of a reform party or sect within the Zadokite circle which originated about 200 B.C. and was still in existence, hoping for better things, as late as near the beginning of the Christian era, the date of the fragment.

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SADE, Donatien Alphonse François, COUNT, popularly called the MARQUIS DE SADE, French libertine and novelist: b. Paris, 2 June 1740; d. Charenton, 2 Dec. 1814. From the age of 14 to 26 he was in active military service until his return to Paris in 1766 when his immoral life became notorious. At Aix in 1772 he received the penalty of death for an unnatural crime and for poisoning, but escaped to Italy. Returning to Paris in 1777, he was rearrested and jailed in Aix, but again escaped only to be recaught and finally committed to the Bastile where he killed time by writing lewd novels and plays. These include 'Justine' (1791); 'Juliette' (1792); 'Philosophie dansle boudoir' (1793) and 'Les Crimes de l'amour' (1800). He had the temerity in 1803 to address a copy of 'Juliette' to Napoleon and was committed to the Charenton Lunatic Asylum where he had spent some time in 1789–90, and there he died. "Sadism," the diseased condition of sexual perversion with cruelty, is named after him.

SADHS, sädz, or **SAADHS,** sä'ädz, a Hindu sect which believes in one God, and teaches a pure morality. The sect was founded in 1658 A.D. by a man called Birbhan. They have no temples, but assemble at stated periods in houses, or courts adjoining them. They are found chiefly in Farukhabad, Delhi, Mirzapore, etc.

SADI, sä-dē', or **SAADI** (MOSLEHEDIN SHIRAZI), Persian poet; b. Shiraz, about 1194; d. there, 1291 or 1292. After completing his studies and spending many years in travel, he settled in the neighborhood of Shiraz, where he enjoyed the favor of several Persian rulers. The Persians esteemed him exceedingly on account of his golden maxims, which they consider a treasure of true wisdom, and also on account of his pure, simple and elegant style. His works comprise (1) a collection (Divan) of lyric poems in the Arabic and Persian languages; (2) 'Gulistan' ('Garden of Roses'), a didactic work composed both of prose and verse, in eight books; (3) a work in verse, called 'Bustan' ('The Orchard'), containing a collection of histories, fables and moral instructions. The complete works of Sadi were published in Persian at Calcutta (1791–95). Graf has published translations from the 'Divan' in 'Zeitschrift der morgenländischen Gesellschaft,' and there is a German translation of the political poems by Rückert (with life of Sadi, 1894). There are editions of the 'Gulistan' by Sprenger (1851) and others, and among English translations are those by Eastwick (1880) and Ross (1823). The 'Bustan' has been edited by Graf (1858) and Rogers (1891), and translated into English by Davies (1883), and in part by Sir Edwin Arnold 'With Saadi in the Garden,' (1888). Consult Ouseley, 'Biographical Notices of Persian Poets' (1846).

SADI-CARNOT, sä-dē kär-nō. See CARNOT.

SADLER, säd'lėr, **Anna Teresa,** Canadian writer: b. Montreal, Quebec, 1856. She has written much for the Roman Catholic press, and her published books include 'Ethel Hamilton, and Other Tales' (1877); 'The King's Page' (1877); 'Seven Years and Mair' (1878); 'Women of Catholicity' (1885); 'The Silent Woman of Alood' (1887); 'Gems of Catholic Thought,' a compilation (1882), etc.

SADLER, or SADLEIR, SIR **Ralph,** English diplomatist: b. Hackney, 1507; d. Standon, Hertfordshire, 30 March 1587. He became the ward of Thomas Cromwell, was one of Henry VIII's principal secretaries of state and was appointed by Henry's will one of the council to assist the executors upon whom was laid the government of the country and the guardianship of young Edward VI. He went into retirement during Mary's reign, but emerged after the accession of Elizabeth, and became one of Cecil's agents, especially charged with negotiating Scottish affairs. In 1568 he became chancellor of the duchy of Lancaster and thereafter he was mainly occupied as one of the English commissioners to treat of matters relating to the queen of Scots. In 1580 he was for a time one of her guardians at Sheffield and Wingfield. His last mission was to James VI of Scotland in 1587 to endeavor to reconcile him to the execution of his mother. Consult Sadler's State Papers, with memoir and historical notes by Sir Walter Scott (1809).

SADLER, Reinhold, American legislator: b. Prussia, 10 Jan. 1848. He came to the United States when young, and has been for many years a resident of Nevada. He was elected lieutenant-governor of Nevada in 1895, and on the death of Governor Jones in 1896 became governor. He was regularly elected to the office in 1898, which he occupied until 1903.

SADLIER, Mary Anne (Madden), Canadian author: b. Cootehill, County Cavan, Ireland, 21 Dec. 1820; d. 1903. She early contributed to London magazines, and in 1844 emigrated to Canada, where she settled in Montreal and in 1846 was married to James Sadlier. She was for many years editorially connected with the Roman Catholic press, and also translated religious and other works from the French. Author of 'Alice Riordan' (1851); 'The Confederate Chieftains, a Tale of the Irish Rebellion of 1641' (1859); 'Purgatory, Doctrinal, Historical and Political' (1886), etc.

SADO, sä'dō, Japan, an island off the west coast of Hondo, opposite and 32 miles from Nügata, with an area of 336 square miles, and a coast line of 135 miles. It has a diversified surface culminating in Kimpokuzan, 3,820 feet high. South of Kimpokuzan is the town of Aikawa, near the east coast, with the ancient and still productive gold and silver mines in its vicinity, to which Sado owes its celebrity. On the west coast 18 miles distant from Aikawa is Ebisuminato, the port of the island. Pop. of island about 120,000.

SADOLETO, sä-dō-lā'tō, **Jacopo,** Italian theologian: b. Modena, 1477; d. Rome, 18 Oct. 1547. He was consecrated bishop of Carpentras, near Avignon, in 1517; belonged to the Contarini Reform party, and was a member of the commission appointed by Paul III to take steps toward effecting a Church reformation. He immediately opened a correspondence with Erasmus, Bucer, Sturm and Melanchthon, but when in 1539 he invited the Genevans to return to the Roman Catholic Church, he received a harsh rebuff from Calvin. After that he confined himself largely to his own diocese. He had been appointed cardinal in 1536, but while he was frequently summoned to Rome he preferred Carpentras, and his study, well-stocked with books of the new learning, in which he was an adept, being one of the Latinists of his day. He wrote commentaries on the Psalms, and on the Epistles of Saint Paul, and so excellent was their style that Erasmus made the somewhat invidious remark that "their very polish of expression will take off the edge of their pious suggestiveness." His works were published in four volumes in 1734. He was a diplomat in whom successive popes had confidence and acted as ambassador to Francis I in the interests of peace in 1544. Consult Joly, 'Etude sur J. Sadolet' (1856).

SADOWA, sä'dō-vä (Czech *Sádová*), Czecho-Slovakia, a village near Königgrätz, on the Bistritz, remarkable as one of the hotly contested Prussian positions in the decisive battle of 3 July 1866, in which the Crown Prince of Prussia and Prince Frederick Charles commanding the Prussians defeated the Austrian forces under Benedek. This battle is known also as the battle of Königgrätz.

SADTLER, sat'lėr, **Samuel Phillip,** American chemist: b. Pine Grove, Pa., 18 July 1847. He was graduated at Lehigh University in 1867 and later studied at the universities of Berlin and Göttingen. He was professor of natural science at Pennsylvania College in 1871–74; assistant professor of chemistry at the University of Pennsylvania in 1874–86, and professor there in 1887–91. He was professor of chemistry at the Philadelphia College of Pharmacy in 1878–1916; and since 1891 has been a consulting chemical expert at Philadelphia. He was chemical editor of the 'United States Dispensatory' (15th to 19th editions); and from 1900 was a member of the committee of revision of the 'United States Pharmacopœia.' Author of 'Hand Book of Chemical Experimentation' (1877); 'Industrial Organic Chemistry' (1891); and joint author of 'Pharmaceutical Chemistry' (1895; 5th ed., 1917).

SÆMUND, sä'moond, **Sigfússon,** THE WISE, Icelandic scholar: b. Iceland, about 1056; d. Oddi, 1133. He undertook a course of foreign travel in pursuit of learning, and visited Paris and Rome; then, returning to Iceland, he became a priest at Oddi (1176). He was unknown to scholars till about 1643, when the newly-discovered 'Elder Edda' and other writings were falsely ascribed to him.

SAFE, a strong and substantial receptacle for money, important papers and valuables, usually of iron or steel, or of both combined; sometimes with a filling of concrete to resist heat. A safe, to justify its name, should be proof against fire, explosives, acids, drills, wedges and the other implements and opening devices resorted to by burglars. The great majority of safes are designed mainly to preserve the contents from fire and to resist sneak-thieves. But the larger and most costly safes are built to safeguard the cash and securities of banks, trust companies, etc. The history of the progress of these strong safes is mainly a record of struggles between the burglar and the safe-manufacturer; the result is, that safes can now be obtained which are all but impregnable. With the modern safe of the best kind the lock may be said to be the only vulnerable point; hence much care and ingenuity have been expended on its mechanism. Numerous patents, mostly of American origin, have been introduced in recent years. Of these, the keyless permutation locks deserve particular mention, as they obviate the danger which arises from lost or false keys. Such locks allow of opening only after an indicator has been moved in accordance with a certain combination of numbers arranged before closing the safe. Some safe-locks are so constructed that to be freed they require different keys on different days, some can only be opened at a certain hour, this being fixed on before the door is closed; while others again require two or more keys in charge of different persons; in fact, the arrangement contrived to render the plundering of safes next to impossible are too numerous even to mention. The connection of safes with electric alarms in a variety of ways forms another safeguard. See VAULT.

SAFE-CONDUCT, a security granted by the sovereign authority, or persons delegated by it, to strangers or other persons to enable them to repair to and return from a certain place undisturbed. In most of these cases passports have now taken the place of special safe-conducts. Sometimes the safe-conduct is given to

persons accused, to secure them against harm when summoned to an examination.

SAFE INDUSTRY IN AMERICA. Various methods for the safe-keeping of treasure, jewels and other valuables have been in use since the earliest periods in history, and the advancement in this line has necessarily kept pace with increased wealth. Thus we have witnessed the evolution from the old-fashioned strong-box to the massive chilled-iron and steel vaults, absolutely fire-proof and burglar-proof, till they have reached the highest degree of efficiency and perfection that science and skill can make them. Locks of rude construction were in use by the ancient Egyptians, and during the Middle Ages by the Romans. The Chinese also used a lock similar in construction to the famous Bramah lock, invented in England in 1784. These were made of wood, the tumblers being of different length to fit the sizes of the wards in the keys. Beginning with the Middle Ages the inventive genius of man was turned toward providing something more substantial than a lock as a method of warding off the burglar, who at that time had not attained to the remarkable skill and cunning of the modern "cracksman," and indeed the professional thief of modern times would look back with envy on his predecessor who had nothing more than a mere wooden box, sometimes bound with iron, with which to cope. The first means of securing valuables was by placing them in some secret cavity in a wall, the door of which was opened by a spring or other device, but more often articles of household furniture were used, such as desks with secret drawers, or tables and chairs with false bottoms. These constituted the chests of the wealthy for some time and some of them were furnished with locks and bound with strips of iron, the whole very artistically made so as to ward off suspicion of their contents. The oaken-chest or strong-box, reinforced with iron bands and knees, was in the beginning of the 18th century considered to be the best means of security. Such a chest was used in 1707 to guard the crown jewels of Scotland.

Prior to the 19th century the all-metal safe was unknown. The first improvement along this line was made in France about 1820, consisting of a metal box built within double walls, the space between being filled with a composition of non-conducting substances. A little later a so-called fire-proof safe was constructed in New England, considered to be a vast improvement over the existing types. This safe had a body of solid oak plank from three to four inches thick, which, after being thoroughly saturated with alkali, was covered with sheets of thin iron. To make this more surely fire-proof, bands of iron were crossed and recrossed over these plates and nailed down with large round-headed iron spikes. The great fire in New York in 1835 proved the worthlessness of these, several hundred of them being then destroyed. The idea of filling in the walls of a safe with non-conducting substances was first put into use in this country in 1843 by Daniel Fitzgerald. His idea was to fill the metal walls of the safe with plaster of paris because of its tendency to throw off heat, and having secured a patent on his invention he immediately began to manufacture a safe known as the "Salamander." His patent was later assigned to B. J. Wildey, who made a safe called "Wildey's Patent," the principle of these being to leave the space between the walls empty, trusting that the contents of the inner portion of the safe would be protected from heat by the non-conducting properties of the air. Other mixtures, such as asbestos, mixed with plaster of paris, clay, alum, fire-clay, mica, chalk, etc., were then used to fill the vacant space, but none of these proved absolutely satisfactory. To-day the modern safe walls are filled either with alum or some other salt, which when heated gives off a quantity of water. Various water-chamber devices have also been employed, with a view to maintaining a body of steam between the inner and outer shells of the safe when exposed to a hot fire.

Outside of the fire element, the most important part of the safe to be considered is the lock, for with our modern methods of fire protection the danger of burglary is often as great as possible loss by fire. The first supposedly non-pickable lock was the Bramah, but was finally proved to be valueless and easily picked, this being done by a Mr. Hobbs, by the "tentative process." Three other locks then came into use, the Chubb, also picked by Mr. Hobbs, the Pye lock, invented in 1851, but picked by Linus Yale, Jr., of Philadelphia, by the "impression process," and the Yale lock. Since then many new forms of locks have been invented, and the modern lock-combinations are constructed in a manner which has made the trade of burglary extremely difficult.

There are three ways of procuring security against burglary, first by the laminated construction; second, by the use of blocks of chilled iron, this method being more useful in the construction of large vaults than in the making of portable safes; and third, by the spherical chilled-iron safe. In the first method of construction the chamber is made of alternate layers of hard and soft plates of iron and of plates of hardened steel, the two laid alternately over each other in the walls of the chamber in such a way that they form a single mass. Thus the body of the safe, being constructed of alternate plates of iron, welded iron and steel, carbonized and decarbonized steel, and crystal steel, fastened together by means of bolts from the inside, has made safes practically impregnable to drills, jimmies, jackscrews and other devices. Another method of making safes, in common use by manufacturers, is to roll down together while hot into one solid sheet of tempered steel three layers of soft iron or steel alternated with two intermediate layers of hard steel. These composite sheets, when they have been rolled till about one-half of an inch thick, are then built into the walls of the safe and alternated with plates of heavy steel about one-half inch thick. The doors are generally the weak point in the construction of a safe, for it is these which a burglar first attacks to see if there is any crevice into which a wedge might be inserted, or any crack into which nitro-glycerine or any other high explosive might be introduced. In some safes the plates comprising the door are dovetailed, engaging with the corresponding parts of the jamb; in some an air-tight packing is used between the jambs and their abutments; while in others a screw door is used.

One solid mass of metal is used in the second and third types of safes, the tough and hard qualities of the metal being obtained by modern processes of steel-making. The metal used is a soft sheet-iron, the surface of which can be hardened by cooling. In the construction of many vaults, blocks of chilled-metal, weighing from three-quarters to several tons, are bolted together on the inside, the sides being dovetailed together, and the outside surface is chilled to the highest degree of hardness. The door is a single casting of steel, two inches thick, and also chilled on the outside.

In the third type, the spherical, invented by William Corliss, the shell, constructed of steel from four to seven inches thick and chilled to a depth of about two inches, sometimes contains a "bugging" made from a special ore. This material, which is excessively hard and is in appearance somewhat like crystallized silver, is so interwoven with wrought-iron rods that it can be battered with immense force without damage. The purpose of this construction of wrought and crystallized iron is to hamper a burglar in his work, it being supposed that in an attempt to drill through the walls of the safe, the drill will penetrate the soft metal more readily than the hard, and, consequently, working sideways, will be broken off when it strikes the hard metal. The "bugging" may, however, be used in precisely the opposite manner, the rods being made of the hardest tool-steel and the body of the filling composed of cast-iron segments, but the principle of turning the point of the "cracksman's" drill is the same. The circular door is especially suitable for the spherical safe. They are closed after the manner of the breech-block of a large gun, with an interrupted thread or screw.

In large banks and safe-deposit vaults there is no room sufficiently large to contain the number of individual safes which would be required to hold the enormous masses of money and other valuable securities with which these institutions are entrusted. This has turned the attention of the manufacturer in recent years to the building of large vaults which would be absolutely fire and burglar-proof. The interior of these vaults may be constructed to suit the tastes and requirements of the owner, but the walls are now made much thicker than formerly and the builder has made more use of fire-proofing materials. The most important feature of the modern vault is the lock, which has now reached the acme of perfection. The first form of lock used was the combination-lock, an outgrowth of the "tumbler" lock, and the mechanism of these is very ingenious. These locks are not limited in the number of combinations upon which they may be set, and may be changed at any time should the combination become known to undesirable persons. The most valuable asset of the modern vault, however, is the chronometer, or time-lock, the mechanism of which is as intricate and as complicated as the best watch, but at the same time it runs as true and as smoothly. To offset any possible disarrangement in the mechanism of a single clock, which would, of course, prevent the opening of the safe, three movements are usually enclosed in a single case. As these safes cannot be opened by any available agency until the time set for the clock to operate the mechanism which swings back the ponderous doors, it is obvious that the chronometer combination is the greatest safeguard against robbery which the bank can employ.

In 1914 there were 31 establishments engaged in the manufacture of safes and vaults, capitalized at $6,898,000. They utilized the services of 2,107 employees, paying wages of $1,366,000; manufactured products totaling $5,366,000 in value, of which $3,571,000 was value added to the cost of materials. These figures indicate a serious reduction in the industry in the decade, for in 1905 there were 3,488 wage-earners, and the gross products were $7,861,000. The value of the American safe has been recognized in foreign countries, and to-day may be found throughout Great Britain, Europe, Asia, Africa, Australia, South America, etc. See LOCK; VAULT, ETC.

SAFED, sä'fĕd, Palestine, occupies the summit of a hill 2,700 feet high, on the shores of the Mediterranean, about 10 miles northwest of the Sea of Galilee. Safed was a fortified place of importance during the Crusades, and is one of the four holy cities of the modern Jews in Palestine, their settlement dating from the 16th century. Pop. (estimate) 19,000.

SAFETY-LAMP. See LAMPS.

SAFETY-VALVE, a device used upon steam boilers and other vessels subject to an internal pressure, for the purpose of automatically preventing that pressure from rising to a dangerous intensity. It consists essentially of an opening in the boiler (or other vessel) over which a suitable lid or "valve-disc" is fitted. The valve-disc is pressed against its opening with a definite, constant pressure, whose magnitude is regulated according to the pressure that the boiler is intended to carry. So long as the pressure that the steam within the boiler exerts upon the under side of the valve-disc is less than the constant force with which the disc is pressed down upon the opening, the valve remains closed and no steam escapes. If the pressure within the boiler rises, however, so that the steam exerts upon the disc a total pressure that is greater than the external force that tends to hold the disc in place, the valve opens and permits steam to escape until the pressure in the boiler is sufficiently reduced for the external force again to close the opening. There are three general types of safety-valve in use, which are respectively known as "dead-weight," "lever" and "pop" valves. The fundamental principle of operation is the same in all and the classification relates merely to the means that are employed to hold the valve-disc against the opening in the boiler. In the "dead-weight" valve this is accomplished by placing weights directly upon the valve-disc. Safety-valves of this type can be recommended for low pressure boilers and they are much used, in England, upon heating and upon kitchen boilers. They are not adapted for use in connection with high pressures, however, for the load resting upon the valve-disc must then be very great, in order to prevent the valve from opening at the ordinary running pressure. It is common, therefore, to use the "lever" type for high pressure service. In this type the valve-disc is held against its seat by the action of a weight, but the weight does not rest directly upon the disc. A horizontal lever two or three

feet long is provided, and this is pivoted at one end, while the weight is attached near its free end. The centre of the valve-disc comes directly under the lever, a few inches from the pivoted end, and the lever is supported by means of a stout vertical rod whose lower end rests upon the centre of the valve-disc. By this means the total downward force acting upon the disc and tending to keep it in position may easily be made to be 8 or 10 times as great as that which would be realized if the weight rested upon the valve-disc directly; and the pressure at which the valve will open can be nicely regulated by shifting the position of the weight upon the lever arm. In the "pop" valve the disc is forced against its seat by means of a stout spiral spring, which is held in position by a framework or casing which is securely attached to the boiler. The compression on the spring is regulated by means of a screw that acts upon its upper end and which can be turned by a wrench. It is now customary, however, to have the adjusting screw entirely within the casing of the valve so that the attendant in charge of the boiler cannot tamper with it; the casing being provided with a lock, the key to which remains in the possession of the owner of the boiler. The name "pop" refers to the sound that these spring valves make when they open and close. Lever valves and dead-weight valves open and close gradually and before they open they give warning by a hissing sound. "Pop" valves, on the contrary, open without any such premonitory signal, and when they close they do so with corresponding quickness. "Pop" valves are used exclusively upon railroad locomotives, as the violent swaying and vibration to which these are subject would render weighted valves undesirable.

SAFFLOWER, a large thistle-like composite plant (*Carthamus tinctorius*) with orange-colored flowers, said to have been originally brought from the East, but now naturalized in many parts of Europe and extensively cultivated. The tubular flowerets are collected, dried and used somewhat as a feeble laxative medicine, in place of, or as an adulterant of, saffron. They are, however, chiefly important as the source of carthamin, a dyeing principle originally much employed by the Chinese and later by Occidental silk manufacturers, as it gives brilliant, although fugitive, red tints; mixed with French chalk it forms the cosmetic rouge. In Spain the flowers are used to color soups and other dishes. The Jews in Poland are remarkably fond of the flowers and mix them with their bread and most of their viands. Oil, in India, is expressed from safflower seeds, for culinary and lighting purposes.

SAFFORD, Truman Henry, American mathematician and astronomer: b. Royalton, Vt., 6 Jan. 1836; d. Newark, N. J., 13 June 1901. He was early known as a calculator of great skill; in 1845 prepared an almanac; by a method of his own he abridged by one-fourth the task of computing the rising and setting of the moon, and after his graduation from Harvard was officially connected with the observatory there, 1854–66. In 1865 he was appointed professor of astronomy in the University of Chicago and director of the Dearborn Observatory; in 1874–76 was a member of the United States Coast Survey, and in 1876–1901 professor of astronomy in Williams College. He was a Fellow of the American Academy of Arts and Sciences, of the American Association for the Advancement of Science and an associate of the Royal Astronomical Society of England. He studied the nebulæ, discovering many new ones; computed cometary and planetary orbits and for some time devoted his attention to latitude and longitude work for the United States Corps of Engineers, for which he prepared a star catalogue. Among his further published writings were a catalogue of polar stars, 'Mathematical Teaching and its Modern Methods,' and numerous contributions to astronomical journals, to the 'Proceedings' of the American Academy and to the notices of the Royal Society.

SAFFRON, a bulbous autumnal plant (*Crocus sativus*) and a commercial dye-stuff obtained from it. The cultivated saffron originated probably in the Levant, and was grown in early times about the town of Corycus, Cilicia (from which the *Crocus* genus may have taken its name). The Arabs cultivated it in Spain about the 10th century, and it was an important crop in England, especially about Saffron Walden, Essex, in the 15th century, bringing the highest market price. It is now raised about the Mediterranean and in Asia. The saffron is low, with the grass-like leaves and long-tubed, funnel-shaped flowers, springing directly from the ground, which are characteristic of the crocuses. Its flower is purple, with a style tipped with three orange-colored stigmas, each more than an inch long, depending from one side of the perianth. These stigmas are picked off in the early morning and dried on a kiln, either loosely or between layers of paper, and under the pressure of a thick board which forms the mass into cakes, about 4,000 of these stigmas being necessary to give an ounce of saffron. In either case the commercial saffron is liable to suffer from adulteration. This adulteration was so prevalent at one time that those guilty of it (when caught) were killed.

Saffron stigmas, when genuine, have a characteristic orange red color and an aromatic, bitter odor and taste. The substance has faint carminative and narcotic properties, but is seldom used medicinally, except for coloring tinctures and occasionally as a diaphoretic in the eruptive diseases of children. In the 'Song of Solomon' the saffron is mentioned among the sweet-smelling herbs, and it was much in demand among the Greeks and Latins for its perfume. A fragrant essence was made from it with water and wine for sprinkling in theatres and other places, even in the streets, for anointing the hair and for the bath. Saffron was also much employed in culinary operations, chiefly for its aromatic taste and for coloring, as the clown in the 'Winter's Tale' says he "must have saffron to color the warden pies."

Saffron, however, is most commonly used as a dye, giving a yellow hue to cloth, but it is being displaced by cheaper colors. This tint was in very early times the royal color in Greece, and was that of some of the women's court robes, but afterward appropriated by the hetairæ. In Ireland and the Hebrides it was also the color of the king's mantle and of the shirts of persons of rank. Saffron enters largely into the composition of the sacred spot on the forehead of a Hindu Pundit. An extract made from saffron, used as a glaze on tinfoil, imitated gold in mediæval illuminations, and was also employed by painters.

HELEN INGERSOLL.

SAG HARBOR, N. Y., village in Suffolk County, on Gardiner's Bay, an inlet from the Atlantic Ocean, and on the Long Island Railroad, about 100 miles east of New York. It has a good harbor, regular steamer connections with New York and several of the Long Island coast towns. It has several manufactories, chief of which are a watch-case and silverware factory, flour and cotton mills, a tannery and machine shops. The Sacred Heart of Mary Academy (R. C.), opened in 1877, a union school, public and parish schools and a library constitute the educational institutions. There are three banks with a combined capital of $100,000. The village is a favorite summer resort. At one time Sag Harbor was noted for its interests in whaling; its income from that industry amounting to $1,000,000 some years. In those days its tonnage equaled that of New York. The Indian relics found in and near the village show it was once an important Indian settlement. Pop. (1920) 2,993.

SAGA, Japan, capital of the province of Fizen, on the island of Kiu-siu, 74 miles northeast of Nagasaki. It is an important seaport and commercial centre. The town is intersected by numerous streams, chief of which is the channel of Sentonofutsi, 50 miles long. It unites the Gulf of Simabara with the Northern Sea, and is of considerable commercial importance. Pop. about 36,500.

SAGA. The word saga is cognate with German *Sage*, "a short tale," with which, however, it must not be confounded in meaning, and with English *saw*, "saying." In its limited and original meaning and without qualification, a saga is a story or group of stories in prose, of an historical character, relating in a series of episodes the whole life-history of a Scandinavian hero and written down in Norway or, mainly, in Iceland during the Middle Ages. The historical events which the sagas narrate took place mostly in the period which extended from the date of Iceland's settlement in 874 to the middle of the 11th century. That was the heroic age of the Icelandic people. At first the sagas were nothing but oral transmissions from one tale-teller to another. Their composition began about the middle of the 12th century and lasted for about 100 years.

In a wider sense the word saga is applied to any narration of events of the past, mythical as well as historical in character, but possessing the traits of the genuine saga. In these tales some legendary champion, from whom the saga takes its name and around whom the important events are centred, is the hero. Heroic achievement and marvelous adventure, fact and fancy, are mingled freely. In the course of generations the saga undergoes important changes, acquires accretions and takes on a more or less poetic and artificial character. Finally it is consigned to writing and handed down as a kind of rudimentary epic. When applied, as they frequently are, to works of that kind, in which the historic element is found in greater or less degree, the words saga, myth, legend, Märchen, epopee and epos are used without clear distinction of meaning.

In the third and last stage of its development, the word saga has come to mean any free creation of the popular fantasy, sometimes incredible or even burlesque in character. Here the historical element is entirely lacking. In its widest sense, saga is sometimes used to include the entire body of the history and mythology of a people, or their literature or some division of it: hence we read of the Norse, German, Irish, or Greek sagas; of saga poetry, saga cycles, heroic sagas, beast-sagas, the Cuchulain saga, the Karl saga, the Nial saga. In Norse mythology Saga is also the name of a goddess.

The Icelandic sagas may be classified (1) geographically, according to the part of the country in which they arose or in which their scenes are located; (2) as major or minor sagas, the latter being more distinctly local in character and simpler in plot and interest than the former; and (3), as here, as (a) historical, (b) mythical, or (c) romantic. To the class of historical sagas belong: The well-known 'Landnámabók,' "Book of Settlements" which contains a list of all the notable men who, up to 930, settled in the island. It contains much that is valuable on the religion, laws and customs of the people. It is preserved only in a version dating from the 13th–14th century. The 'Islendingasögur,' which embody the lives and achievements of celebrated Icelanders and the fortunes of great Icelandic houses from 950 to 1130. The 'Biskupasögur' are biographies of Icelandic bishops who flourished in the 11th and 12th centuries; they constitute an ecclesiastical history of Iceland, of less literary interest than the secular sagas but of the utmost historical value.

It would be difficult to say how much is to be regarded as authentic history in 'Nóregs Konungasögur,' also called 'Heimskringla,' "World-Circuit," from the words with which it opens. This was the work of the greatest of all Icelanders, Snorri Sturluson, who was born in 1178 in West Iceland and became distinguished as statesman, scholar, poet and sagaman. It was written about 1230 and gives the history of the kings (chiefly) of Norway. The Icelanders never lost the feeling of connection with the motherland with which their country was in close relations especially in the time of Harald Hårfagri, when Iceland was settled, and of Olaf Tryggvason, when it was converted. The Heimskringla possesses all the most excellent features of the best saga-art. At about the same time the 'Gudhmundarsaga Dyra' was written. Of historical importance also is the 'Sturlungasaga,' "the history of Sturla," which is a collection of later Islendingasögur, telling of events which happened as late as the year 1250. The tales belonging to this saga arose in West Iceland about the beginning of the 14th century and contain some of the finest narrative passages in the whole body of Icelandic literature. The 'Thordharsaga Sighvatssonar' treats of Icelandic history up to the same period. The mythical sagas are those that treat of the old heroic legends, some of which, like the 'Völsunga Saga,' which is a prose rendition of the Nibelungen story as given in the Eddic lays, are the common property of all the German peoples, while others,

like the 'Frithjofs Saga,' is particularly Scandinavian.

The 'Fornaldarsögur' "Tales of the Past" deal with the early history of Iceland and are partly of a fairy and romantic character, telling of Viking voyages, love adventures, battles with berserker and monsters. The romantic sagas, as, for example, the 'Riddarasögur,' are mostly translations or adaptations of foreign (chiefly French) courtly epics and romances of chivalry, such as the tales of Troy, of Alexander, Charlemagne, Arthur and the Round Table, Barlaam and Josephat. They were reduced to writing in the 13th century and became favorites in the 15th. They are purely literary and have no historic value. Besides these, which are the three principal classes of sagas, there is a kind called Thättr, which is a short tale treating of a single episode in the life of a distinguished Icelander, and the simplest form of saga. There are also sagas dealing with the Faroes, the Orkneys, Norway, Denmark, Greenland and America. Among the minor sagas may be mentioned 'Gísla,' which is perhaps the most tragic of all the sagas, or at any rate the most conscious of its tragic aim; 'Gretis Saga'; 'Bandamannasaga' ('The Confederates'), which, quite exceptionally, is humorous and the first comedy in western Europe; 'Kormákssaga,' which is very romantic; 'Erikssaga Raudha' ('The Saga of Erik the Red'), which tells of the discovery, in 982, by Erik, of Greenland and Vineland; his son Leifr discovered the North American coast, probably Nova Scotia; 'Bjarnarsaga,' 'Heidharvigasaga,' 'Víga-Glúmssaga,' 'Vápnfirdhingasaga' and 'Hrafnkelssaga Freysgodha,' which belong to the 12th century; 'Gunnlangssaga' and 'Flóamannasaga,' which were composed in the 13th century; and 'Hítdælakappa,' 'Hænsna Thórissaga,' 'Hardharsaga,' 'Grimkelsson,' 'Gullthórissaga, 'Fósthbrœdhrasaga,' 'Vatzdœlasaga,' 'Svarfdœlasaga,' 'Valla-Ljótssaga,' 'Ljósvetningasaga,' 'Reykdœlasaga,' 'Thorsteins-Hvíta' and 'Droplaugarsonasaga.'

The following four are the greatest of the Icelandic sagas: (1) The 'Eyrbyggjasaga,' which covers a period of about 140 years (890–1030) and was written probably by a cleric about 1225. It is remarkable for the great variety and richness of its adventure and for the light it throws on the manners and customs of the period. Its style is serious, measured and realistic. (2) The 'Egilssaga,' which takes its name from that of the skald (poet) Egill, portrays the life of the 9th and 10th centuries. As his sources, its author made use of oral traditions, other saga material and Egill's own poems and put the whole into writing about the year 1200. (3) The 'Laxdœlasaga' is, for the modern reader, the most romantic and one of the most attractive sagas. The incidents took place between 910 and 1026, and the scene is laid among the people of Laxátals in West Iceland. Here, too, the author, who was also probably a cleric, made masterly use of his sources, some of which may have been Irish, both oral and written. (4) The saga universally recognized as the ripest and most brilliant product of the saga-art is the 'Njálssaga.' It is composed of two originally independent sagas, those of Gunnar and Njál and belongs to the south of Iceland. It is designed on the most liberal scale and is remarkable for the masterly way in which its plot, full of intrigue, love and hate, has been handled, and for its character-drawing and simple and effective style.

In Iceland and Ireland, more than anywhere else in western Europe, story-telling was a necessary part of every assembly. The professional sagaman wandered from place to place, told his stock-in-trade, received entertainment and rewards in return for them and gathered material for new stories. These tales, both those of an historical and those of a legendary character, being of oral transmission, even when later they were thought fit to be consigned to writing, always used the oral saga as a background. Almost all the events narrated in them took place between the years 950 and 1030. That was the Saga Age of Iceland, when life, in a material sense, was almost barbarous and factional fights were of frequent occurrence. The sagaman made most of the abundant stuff at hand for heroic narrative. His heroes are represented as being almost more than human men and women. They belong, for the most part, to the ruling class. The author gives a short account of the hero's family, of his youth and manhood, his loves, friendships and enmities, his great deeds and his death, which was usually of a tragic character. Being based almost entirely on actual happenings and being in close relation to the lives of those for whom they were recited or written, the sagas convey a wonderfully faithful picture of life not only in the Scandinavian world during those centuries but also among the other Germanic peoples who once lived in similar circumstances but have left no such record of their own past.

The very language in which the sagas are couched is greatly conducive to the appearance of reality. It is in prose and very often in the form of dialogue. As the sagaman's main object was to move his hearers, he told his tales in unaffected, straightforward language, the everyday language of the people. Like a dispassionate observer, showing no sympathy with either the events or their heroes, he was content to assemble the incidents and to relate them briefly and restrainedly. The result, however, is much more than a mere impersonal folktale. Even at that early date it is surprising how clearly the essential rules of all good story-telling seem to have been fixed and were observed to perfection; dramatic irony and suspense; the orderly, steady progression of the scenes; the recurrence of personages familiar from other sagas, the chief figure in one becoming a subordinate character in another; the incidental mention of unheroic "mean" details; all this adds to the interest of the saga. One thing the Icelandic sagaman — like the contemporary Irish *sgéulaidhe* — could do supremely well, and that was to tell a story. The Icelandic sagas stand apart at once as a notable phenomenon in literary history and as an absolutely independent creation of the northern mind. See ICELANDIC LITERATURE.

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SAGARD-THEODAT, Gabriel, French Catholic missionary: b. 16th cent. He labored in converting the Huron Indians to Christianity during the 17th century and contributed in an important degree to a knowledge of Canada in its early colonial days as "New France." His principal works are 'Travels to the Huron Country, towards the Freshwater Sea and the Uttermost Limits of New France, called Canada; Wherein is Treated of all Matters touching the Country, the Manners and Character of the Savages; their Government and their Ways, as Well in their Own Country as when Roaming; of their Faith and Belief; with a Dictionary of the Huron Language' (1632); also 'History of Canada and the Journey Made by the Friars Minor Recollects Thither, for the Conversion of Unbelievers' (1636). An edition of his works was published at Paris in 1866.

SAGASTA, sä-gäs'tä, **Praxedes Mateo,** Spanish statesman: b. Torrecilla de Cameros, 21 July 1827; d. 5 Jan. 1903. He studied at the College of Engineers in Madrid; practised as an engineer in Valladolid and Zamora; in 1854 was elected from Zamora province to the Cortes, where his attitude was a radical one. In 1856 for participation in an unsuccessful revolt he was compelled to escape to France. Upon the proclamation of amnesty he returned, became professor in the Madrid College of Engineering, re-entered the Cortes, was identified with the Progressive minority and edited its journal, *La Iberia.* After the outbreak of 22 June 1866 he again fled to France, but at the beginning of the revolution of 1868 was once more in Spain, where he became Minister of the Interior in the provisional government. In October 1871 he was chosen to the presidency of the Cortes; in December he entered the Malcampo Cabinet as Minister of the Interior; in February 1872 was commissioned to form a new ministry, but in May was forced to resign. In 1874 he appeared anew in office as Minister for Foreign Affairs in the Serrano Cabinet, but shortly afterward exchanged his portfolio for that of the Interior, and in August became president of the Ministry. He retired from office at the accession of Alfonso XII; for a time was a leader without a party; as a member of the Cortes was finally associated with Martinez Campos (1881) in the organization of the new Liberal party, and upon the overthrow of the Conservatives became president of the Ministry. He was forced from power in 1883. Subsequently he was president of the Cortes in 1883–84 and of the Ministry in 1885–90 and 1892–95. In September 1897 he was again summoned to form a cabinet. He recalled Weyler from Cuba, appointed Blanco captain-general and drafted a plan for Cuban autonomy. Although opposed to the war with the United States he waged it with such efficiency as his limited resources would permit and was loudly denounced for signing the treaty of peace. On 4 March 1899 he resigned with his entire cabinet, though on 6 March 1901 he again took the helm and, after averting a Carlist insurrection, remained in office until 3 Dec. 1902. He has been characterized as "singularly devoid of the blind arrogance which has been the bane of so many Spanish statesmen." After Canovas' death he was conceded to be the greatest political figure of Spain.

SAGE, sāj, **Henry William,** American philanthropist: b. Middletown, Conn., 13 Jan. 1814; d. Ithaca, N. Y., 17 Sept. 1897. In 1832 he engaged in the lumber business which he conducted until 1854, settling at Ithaca, N. Y. He entered the New York assembly in 1847. His earlier benefactions were the endowment of various schools and churches, the West Bay City, Mich., public library, and the Lyman Beecher lectureship at Yale College. In 1870 he became a trustee of Cornell University and his various gifts to that institution were $266,000 for the Sage College for Women; $200,000 for the Sage School of Philosophy; $50,000 for the Susan Lynn Sage chair of philosophy; $260,000 with an additional endowment fund of $300,000 for the University Library Building; $20,000 for the Museum of Classical Archæology; $11,000 for the Sage professorship of philosophy; $300,000 for floating indebtedness. His careful management of timber lands owned by the institution realized for it about $6,000,000.

SAGE, Russell, American capitalist: b. Verona Township, Oneida County, N. Y., 4 Aug. 1816; d. Lawrence Beach, L. I., 22 July 1906. He began life as clerk in his brother's grocery store; entered the retail grocery business for himself in 1837, and during 1839–57 was a wholesale grocer at Troy, N. Y. He was alderman of Troy in 1841–47; treasurer of Rensselaer County, and a Whig member of Congress during 1853–57. In 1863 he removed to New York and shortly began large operations in railroad and other securities. He accumulated one of the largest fortunes in America and was director in many large corporations.

SAGE, Russell, Mrs. (MARGARET OLIVIA SLOCUM), philanthropist: b. Syracuse, N. Y., 8 Sept. 1828; d. New York, 4 Nov. 1918. She was the daughter of Joseph and Margaret Pierson (Jermain) Slocum, and after early vicissitudes graduated at the Emma Willard Seminary at Troy, and became a school-teacher. She taught in schools at Philadelphia, Syracuse and Troy, until at the age of 41 she became the wife of Russell Sage (q.v.), a grocer at Watervliet (then West Troy). Their home life continued simple, in spite of the great wealth which they accumulated, and Mrs. Sage took such deep interest in her husband's affairs that five years before his death he turned over to her complete control of his business and found that his faith was borne out by her successful operations. After his death her life was largely devoted to benevolent work and during the last seven years of complete stewardship of the $70,000,000 left by her husband, she returned nearly $30,000,000 to the public by systematic philanthropies.

SAGE, William, American novelist, son of Abby Sage Richardson (q.v.): b. Manchester,

8 May 1864. He was educated in France and Germany, was engaged in railway and banking business 1881–96, and since then has given his attention to literature. He has published 'Robert Tournay' (1900); 'The Claybornes' (1902); 'Frenchy — The Story of a Gentleman' (1904); 'The District Attorney' (1905); 'By Right Divine' (1907); 'A Maid of Old Virginia' (1915).

SAGE, a name covering both the common garden herb (*Salvia officinalis*) and other plants of diverse families, somewhat resembling it in color or odor. The cultivated sage is a mint, and the genus differs from the majority of labiates in having two stamens instead of four. It is a native of southern Europe, a shrubby perennial of hoary aspect, bearing rough, wrinkled, gray-green, opposite leaves, on the decumbent stems, and pale-blue, streaked flowers in verticillate spikes at the extremities of the branches. It has been widely cultivated, for at least three centuries, on account of its aromatic odor and bitter, pungent taste. It was formerly used in medicine, having slight tonic, stimulant and astringent properties. An infusion of the plant, or "sage-tea," was drunk in England before the advent of Chinese tea, was a favorite remedy for colds and is even now employed as a gargle. An old English proverb states that "He that would live for aye must eat sage in May." See Herbs, Culinary.

Many salvias, or sages, are frequently cultivated for their brilliant flowers. The most common, perhaps, are the scarlet sage or salvia (*Salvia splendens*) with racemes, perhaps a foot long, of slender flowers two inches long, arranged in whorls, both calyx and corolla being of a most brilliant scarlet hue; and the equally large-flowered but blue-tinted *S. patens.* The woolly white foliage of *S. argentea* has caused it to be included in gardens, and there are a score of others quite worthy of cultivation for ornament.

Several genera of the *Chenopodiaceæ,* a family which takes kindly to alkaline soils, and which inhabit the desert regions of western North America, are called salt white, or silvery sages. Bitter sages are composites, and are more commonly known as sage-brush (q.v.). The salt sages are species of *Atriplex,* living on thousands of acres of waste lands, which are strongly impregnated with alkali, and so dry that little other vegetation can exist. Since water is so scarce in certain of these alkali deserts, stock cannot be taken into them in summer, and the sages make a good growth, the fruits, valuable for their nutritive qualities, become ripened and the leaves "sun-cured," which, together with the tender spring shoots, make excellent forage, particularly for sheep. The flocks are taken in in winter, when the snow furnishes water for them, and eat the salt-bushes greedily, Nuttall's sage (*A. nuttallii*) being the most valuable, as it is perennial with a deep, woody root, and although cropped, seeds and all, quite down to the ground, survives and starts up again, during the summer, when it is undisturbed. In fact, the constant cropping of these pastures, and the constant manuring, are improving the winter ranges, which are thus becoming nearly as valuable as the summer ones. The white-sage or winter-fat (*Eurotia lanata*) is another highly prized winter forage plant, a foot or more high from a shrubby base, whitened with long hairs, perennial and with abundant fruit, that contributes largely toward the great fattening qualities attributed to this sage, which is also supposed to have a beneficial effect on the grazing stock. The shad-scale, a spiny, shrubby salt-sage (*Atriplex confertifolia*) produces in the spring tender shoots and thick succulent leaves and enormous quantities of flat, winged seeds. These are eagerly sought at the time, and, in the autumn, when leaves and fruit have dropped and been blown into hollows of the plain, the sheep seek them out and devour them utterly.

Helen Ingersoll.

SAGE-BRUSH, any one of the species of the genus *Artemisia* — composites very abundant in the arid, alkaline regions of the western United States, where the soil is not too saline, and, with other desert vegetation, covering immense areas. The best-known sage-brush is the common shrub, or bitter-sage (*A. tridentata*), which is found growing on the plains and ascending to the sub-alpine parts of the mountains. It varies in different situations from a dwarfed shrub to almost tree-like proportions, when its trunk near the ground will measure nearly a foot through, being twisted and knotty and loosely enveloped in a light-gray, shreddy bark.

SAGE-BRUSH STATE, or **SAGE-HEN STATE,** a nickname for the State of Nevada, from the large amount of sage-brush growing there.

SAGINAW, Mich., city and county-seat of Saginaw County, on the Saginaw River, 16 miles from Saginaw Bay, 97 miles northwest of Detroit and 65 miles northeast of the capital at Lansing. The railroads entering the city are six divisions of the Pere Marquette, three divisions of the Michigan Central and one division of the Grand Trunk. Built upon both banks of the beautiful Saginaw River, here spanned by seven public and four railroad bridges, the city lies at the head of deep-water navigation communicating with the Great Lakes. The fourth in size in the State, Saginaw is a city of great beauty and attractiveness; it possesses an ideal climate without extremes of heat or cold, has handsome residences and ranks well with any city in the United States in the percentage of fine modern homes owned by its workmen. Upon the Dixie highway, surrounded by an excellent road system, it is a central point of the tourists' highways of the State, readily accessible to automobile tourists.

Industries, Manufactures, etc.— Industrially the city is fortunate in possessing an immense supply of hydro-electric current, and being the centre of the bituminous coal fields of Michigan, from which over 2,000,000 tons are mined annually in the neighborhood. Lumber, sand quarries and salt wells also abound, and a productive sugar-beet region is cultivated. Saginaw was at one time the centre of the white pine industry, and millions of dollars worth of logs have been floated on her river. This vast industry, through defotestation, has given way to manufacturing, and the city is now distinctively a manufacturing and jobbing centre. Some of the manufactures are products of numerous general mortar plants, beet sugar, plate glass, salt, iron and steel products, furniture, pianos and musical instruments, vehicles, baskets and a great variety of wood products, automobiles and flour. It has planing mills, lumber assorting yards, brick yards, tanneries, graphite works and a variety of foundry and machine shops, in addition to the big shops of the Pere Marquette Railroad Company. Over $35,000,000 of capital is invested in manufacturing industries, and the annual value of the total products averages nearly $30,000,000.

Municipal Conditions.— Strong banks, metropolitan newspapers, a commission form of government since 1914, low tax rates, 100 miles of pavements, $10,000,000 in pavements, sewers, sidewalks and other municipal improvements, public baths and playgrounds, 60 churches, are evidences of healthy civic development and growth. Saginaw has model school system which has set and kept the pace with other communities. It has been quick to grasp the public pulse and take advantage of advanced 20th century ideas. The city has an advanced trade school in the Arthur Hill Trade School and a splendid manual training school in the Burt Institution. The Public and the Hoyt libraries are also well-equipped institutions. The hospitals are the Saginaw General Hospital, Saint Mary's Hospital and the Woman's Hospital. Other charitable institutions are the Home for the Friendless and Saint Vincent's Orphan Home. The city has one of the finest Masonic Temples in the State, Elks' Temple, a handsome Federal building and post office, city hall, courthouse, K. of C. and Y. M. C. A. buildings, handsome clubhouses, theatres and numerous capacious public halls. The streets of the city are for the most part notable for their width. They are traversed by an excellent electric street railway system and interurban roads reach out into the surrounding country. The east and west sides are connected by a number of fine bridges over the river, so that access is easy from the business centre to the most remote parts of the city. In addition to the numerous small parks, the city has a large suburban resort, operated in connection with the street railway system.

History and Population.— The site upon which this prosperous community is located was first settled in 1815 by men of French origin and half breeds; and here, 24 Sept. 1819, the Treaty of Saginaw was concluded between Gen. Lewis Cass and the Indians, which ceded extensive tracts of land to the United States. The city of Saginaw is a consolidation of old Saginaw City, East Saginaw and the village of Salina or South Saginaw. The latter was incorporated as a village in 1866 and became a part of East Saginaw in March 1873. East Saginaw was incorporated as a village in 1855 and as a city in 1859. Saginaw City was never incorporated as a village, its first incorporation being as a city in 1857. The two municipalities, East Saginaw and Saginaw City, were consolidated by act of the legislature of 1889 into the city of Saginaw, and the first meeting of the common council of the consolidated city was held 12 March 1890. The population of Saginaw is cosmopolitan in character, the German possibly predominating, as attested by their numerous large and prosperous societies of an educational and social character. The Irish, French, Polish and Bohemian are also conspicuous elements of the city's population, which was, in 1920, 61,903.

Chester M. Howell,
Assistant Secretary, Saginaw Board of Commerce.

SAGINAW, a river in Michigan which is formed by the junction of the Flint and Shiawassee, and flows nearly due north into Saginaw Bay. The main stream is only about 20 miles long, but with its branches it drains a large portion of the Lower Peninsula. It is navigable to the city of Saginaw, 16 miles.

SAGINAW BAY, the largest inlet of Lake Huron on the coast of the United States. It indents the east coast of the Lower Peninsula of Michigan. It is about 60 miles long and from 20 to 30 miles wide. It is a safe harbor and never dangerously rough, although it is sometimes subject to storms. The color of the water is different from that of the open lake; it is a brownish-green.

SAGITTARIA, săj-ĭ-tā'rĭ-a, a genus of plants of the water-plantain family (*Alismaceæ*). It is a widely distributed genus, wholly or partly aquatic, native to the temperate zones and the tropics. The species are handsome, with lance-like, elliptical or arrow-shaped leaves, erect or floating; the flowers are verticillate in threes around the upper part of the scapes that carry them well above the water, and are three-parted, with beautiful white and crinkled fungacious petals. The common arrow-head (*S. latifolia*) grows in the mud along rivers and ditches, and is very ornamental with its charming whorls of flowers rising from the centre of a cluster of large, erect, sagittate leaves, varying surprisingly in different plants in respect to size and shape. It is a perennial, with thick fibrous rootstocks, which produce oval, fleshy tubers, often as large as a hen's egg, abounding in starch, and a staple and nutritious article of food with many Indian tribes. The squaws sometimes waded into the mud where the arrowheads grew thickly, loosened the tubers with their toes and when the plants floated to the surface captured them and flung them into canoes, to be boiled or roasted. *S. chinensis* is cultivated in China for food.

SAGITTARIUS, săj-ĭ-tā'rĭ-ŭs, *in astronomy,* the ninth sign of the zodiac, into which the sun enters 22 November. The constellation consists of eight visible stars. It is represented on celestial globes and charts by the figure of a centaur in the act of shooting an arrow from his bow.

SAGMULLER, Johannes Baptist, German ecclesiastical historian: b. Winterreute, Württemberg, 24 Feb. 1860. He was educated at the Latin School of Mergentheim, the Ehingen High School and the Seminary of Tübingen. He was ordained to the Roman Catholic priesthood in 1884; was curate at Alpirsbach in 1884–87, and tutor at Tübingen Seminary in 1887–93. He was special professor of history in 1893–96 and since 1896 has been professor of canon law and pedagogics at the University of Tübingen. His published works include 'Die Papstwahlen und die Staaten von 1447–1555' (1890); 'Die Papstwahlbullen und das staatliche Recht der Exklusive' (1892); 'Zur Geschichte des Kardinalats' (1893); 'Die

Tätigkeit und Stellung der Kardinäle bis Papst Bonifaz VIII' (1896); 'Die Entwicklung des Archipresbyterats und Dekanats bis zum Ende des Karolingerreichs' (1898); 'Lehrbuch des katholischen Kirchenrechts' (1904; 2d ed., 1909); 'Die kirchliche Aufklärung am Hofe des Herzogs Karl Eugen von Württemberg' (1906); 'Die Trennung von Kirche und Staat' (1907); 'Wissenschaft und Gleube in der kirchlichen Aufklärung' (1910); 'Unwissenschaftlichkeit und Unglaube in der kirchlichen Aufklärung' (1910); 'Der Rechtsanspruch der katholischen Kirche in Deutschland auf finanzielle Leistungen Seitens des Staates' (1913). He has also contributed to periodicals and encyclopedias.

SAGO, a farinaceous food, obtained from the central portion of various species of tropical palms, principally, however, from *Metroxylon rumphii* and *M. laeve.* The sago-palms flourish in wet soil, and are cultivated in the East Indies, and particularly in Sarawak. They are rarely over 30 feet high and have stout stems, with an outer rind about two inches thick, as hard as bamboo, but filled with spongy pith, containing a large proportion of starch.

The preparation of sago is one of the industries of the East Indies. The trees flower only once, and if allowed to do so, and to fruit, would exhaust the mass of starch stored in their stems, and then die, after propagating themselves either by seeds or by offshoots. To prevent this, the trees are felled when they are about 15 years old and on the point of flowering. The starchy tissue, then most productive, is extracted and pounded or grated to a powder. This is kneaded in water, in a cloth or sieve, the escaping water carrying the starch into a trough, where it is washed and settled out, until fit for use. The water is then drawn off and the caked residue is ready for native cookery. This cake, or meal, when made into a paste and pressed through a sieve, forms fine pearly grains, which are left either in their original brownish hue, or are bleached, and compose the commercial product «pearl-sago.»

Sago-meal is eaten by the natives as pottage, or as biscuits, partially baked in earthen molds. It is not entirely soluble in hot water, as is ordinary starch, and can, therefore, be employed in making puddings, etc., forming a valuable article of food, as it is cheap, nutritious and easy of digestion. In Europe it is used for feeding stock, making starch and by cocoa manufacturers for their beverages. Inferior qualities of sago are produced by *Phœnix farinifera, Corypha* of various species, *Caryota urens, Raphia flabelliformis,* and two South American palms.

Portland sago is a delicate farina extracted from the corm of the European wake-robin (*Arum maculatum*). Wild sago is the product of the coontie-root (*Zamia integrifolia*), a cycadaceous plant of Florida, well known as an article of food among the Seminoles; and other cycads, incorrectly called «sago-palms,» furnish a coarse kind of sago.

SAGOIN, sa-goin', or **SAGOUIN,** a French form of the native South American name of a genus (*Callithrix*) of Brazilian monkeys, of small size and remarkably light, active and graceful in their movements.

SAGOYEWATHA. See Red Jacket.

SAGUA LA GRANDE, sä'gwä lä grän'dä, Cuba, town in the province of Santa Clara, on the Sagua la Grande River, 150 miles east of Havana. It is connected by railroad with La Isabela, its port on the north coast, with Cienfuegos, Havana and Matanzas, and with towns to the east; and carries on a considerable trade, sugar and molasses being the chief exports. Formerly gold was mined in the vicinity to some extent. It is well built, with wide and regular streets; among its public buildings are a hospital, a town-hall and a large church; it has also several schools. Pop. about 12,500.

SAGUENAY (săg-ĕ-nā) **RIVER,** Canada, large river in the province of Quebec, emptying into the Saint Lawrence at Tadousac Harbor. It is about 120 miles long and of remarkable depth — 17 to 500 fathoms. It drains Lake Saint John and flows with almost unparalleled impetuosity, between high rocky walls and over deep precipices, forming numerous falls and cataracts in its upper course. Its magnificent scenery attracts many tourists. It is navigable for large vessels as far as Ha Ha Bay, 10 miles south of Chicoutimi.

SAGUNTUM, sa-gŭn'tŭm, now **SAGUNTO,** or **MURVIEDRO,** Spain (*Hispania Tarraconensis*), situated near the mouth of the Palantias, three miles from the coast and 18 miles by rail from Valencia. It was a rich commercial town in early times, especially famous for its figs and manufacture of a certain kind of pottery. The town was founded by Greek, according to some, and by Italian colonists. In the interval between the First and Second Punic wars, it formed an alliance with the Romans, and became celebrated for the resistance it made to Hannibal in the siege of 219–218 B.C. The city was nearly destroyed at this time, but the Romans rebuilt it and made it a colony. The ancient city is now replaced by the modern Murviedro, and the only important ruins are those of the theatre. Pop. about 9,000.

SAHAPTIAN. See Shahaptian Indians.

SAHARA, sa-hä'ra, Africa, the great desert region in the north of the continent, extending from the Atlantic eastward as far as the Nile, and from the Mediterranean provinces to the Niger and Lake Tchad. Its area is about 3,459,500 square miles,—a region equal to the whole of Europe. The configuration is irregular and the surface highly diversified, reaching from 100 feet below the sea-level to an altitude of from 5,000 to 8,000 feet in Mount Tusidd. Some of the highest summits are those of the Ahaggar, a great mountain plateau. Air or Asben is an isolated mountain, midway between Tibesti and the Niger. Farther south is the extensive plateau of Adghagh. At the northeast in Fezzan are the dark mountains of Jebel es Sóda. The rest of the Sahara consists generally of undulating rocky surfaces and sand dunes interspersed with occasional oases. The date-palm flourishes on these green spots, also the olive tree. Apples, peaches, oranges, grapes, etc., grow, and wheat, barley, rice, durra and other tropical crops are raised, and there is a considerable variety of flora. Mammals consist, outside of the domestic animals, such as camels, asses, black cattle, etc., of 15 species, comprising the jerboa, fox, jackal, baboon, hyenas, mountain sheep, etc.; about 80 species of birds, among which is the ostrich. There are also tortoises, lizards, chameleons, serpents, such as the python, horned viper, etc. The edible frog and fish also occur. There is an important trade in silk tissues and mixed goods, ivory, ostrich feathers, gums, spices, musk, hides, gold dust, indigo, cotton, palm oil, kola nuts, silver, dates, salt and alum. The exports are textiles, weapons, gunpowder, etc. Many thousand tons of phosphate are extracted. The range of temperature is very great. The chief centres of population are the oases. The inhabitants consist of Moors, Tuareg, Tibbu, Negroes, Arabs and Jews; the former occupy the region between Fezzan and Lake Tchad. The tribes of the desert inhabit the south of Algeria and Tunis. The Tuareg control the principal caravan routes. The Tibbu, who number about 200,000, live in the oases between Fezzan and Lake Tchad. The tribes of the desert are, generally speaking, camel drivers, slave and salt dealers, guides and robbers. A few possess date-groves, but they usually subsist on the milk of their herds, bartering for fruits or grain. The principal caravan routes lead from Timbuktu to the Wady Draha, and to the oasis of Twat; from Haussa by Air or Asben and Ghat to Ghadames and Murzuk; from Bornu by Bilma and Murzuk to Tripoli; from Wady by Ojariga, Kufara and Aujilah to Benghazi, and from Darfur to Siut. Pop. about 2,000,000.

SAHARANPUR, sa-här-an-poor', or **SEHARUNPOOR,** sē-här-ŭn-poor, India, (1) capital of a district of the same name, in the United Provinces of Agra and Oudh, 90 miles northeast of Delhi. It is an important railway junction. Among the buildings the most noteworthy are an old Rohilla fort (used as a courthouse), and a fine Mohammedan mosque. The residential part is substantial and modern. There is a church, an American Presbyterian mission and a fine botanical garden for experiments in tea and cinchona. Commerce in grain, sugar, molasses and country cloth is considerable. Pop. about 70,000.

(2) The district in the Meerut division has an area of about 2,242 square miles, and occupies an alluvial table-land between the Ganges and the Jumna. It consists partly of wildly picturesque broken ground, but the larger portion is tillable. Cereals are the chief products, and its commercial importance is considerable. Pop. about 1,200,000.

SAHIB, sä'ĭb, the term of native address in India to a reputable European. It is an Arabic word, signifying companion or lord. The feminine form is *Sahibâ.*

SAI, sä'ĭ, a Brazilian native name for a local monkey of indefinite application, most often, perhaps, designating the capuchin (*Cebus capucinus*).

SAID PASHA, sä-ēd päsh'ä, Turkish statesman: b. 1835; d. Constantinople, 29 Oct. 1907. He commanded an army corps in the Russo-Turkish War, became governor of Cyprus and was later appointed Secretary of State. He was Premier 1879–82, was grand vizier 1882–85 and was twice dismissed but reinstated by the sultan in 1883. In 1885–95 he was Minister of Foreign Affairs, and subsequently president of the Council of Ministers.

SAIGA, sī'ga, an antelope (*Saiga tartarica*) found on the steppes of Russia and in western Asia. It is about two and one-half feet high at the shoulders, pale bluish-gray in color and is remarkable for the greatly swollen appearance of the nose, due to the thick cartilaginous coverings of the nostrils. It once had a far wider habitat in Europe, and is steadily diminishing in range and numbers.

SAIGO, Kichinoswke Takamori, Japanese general and patriot: b. Kagoshima, 1825–32; d. there, 24 Sept. 1877. He was of the samurai class and from early youth an enthusiastic partisan of the Mikado. In 1858 the vigor with which he urged the overthrow of the Tokugawa administration caused his banishment to Satsuma. He took an important part in the restoration of the Mikado in 1868, fighting with the forces of the imperial family in the civil war which preceded it. He was afterward appointed commander-in-chief of the army by the Mikado and retained the office until 1873 when, his desire to attack Korea being overruled, he resigned and retired to Kagoshima. Himself of the samurai class, which was largely disaffected because of opposition to the progressiveness of the emperor, he rallied a large force to his support and early in 1877 launched a rebellion against the government. After continued stubborn fighting and a steady, if slow, forced retreat he fell in action at Kagoshima. The government, notwithstanding his attempt to overthrow it, mindful of his invaluable services in establishing the Mikado on the throne, afterward erected a bronze statue of him at Tokio.

SAIGO, Yorimichi (Judo), Marquis of, Japanese field-marshal and statesman, brother of K. T. Saigo (q.v.): b. Satsuma, 1843; d. 1902. He was of the samurai class and took a prominent part in the restoration of the Mikado in 1868. In the crisis of 1873, when his brother Takamori withdrew from office, Saigo remained in sympathy with the government. He commanded the Japanese expedition to Formosa in 1874, and from 1877 until his retirement in 1900 held various cabinet offices. He received rank as marquis in 1895.

SAIGON, sī-gŏn (Fr. sī-gôn), or **SAIGUN,** Indo-China, the capital of Lower Cochin-China before the French conquest, is on the right bank of the Saigon or Don-nai River, 34 miles from the sea. The town was nearly destroyed by the French, and the present city dates practically from 1861. It has fine public buildings, modern shaded streets and zoological and botanical gardens; of educational institutions, the colleges of Chasseloup-Laubat and d'Adran are the most important. There is a large floating dock. The majority of the population is Asiatic, the Chinese element predominating. The town has an active trade with China, Siam, Singapore and Java. Considerable French and English goods are imported. The main exports are rice cotton, silk and hides. The great market is Cholon, three and one-half miles from Saigon. Pop. about 80,000; Cholon, 127,000.

SAIL, or **SAIL-TAILED, LIZARD,** a large agamoid lizard (*Lophurus amboinensis*) of the Philippines, Celebes, Java and neighboring islands, which takes its name from the tall sail-like crest bone upon the upper surface of

the tail of the adult, which is supported by a great lengthening of the spines of the vertebræ of that region; the tail otherwise is highly compressed, long and powerful. The lizard frequently exceeds three feet in length, is olive-green, spotted and marbled with black, and has many curious folds of skin about the neck. It is strong and active and spends much of its time in trees, but when alarmed or chased rushes for water, dives to the bottom and endeavors to hide among the stones. It is defenseless and harmless, and its flesh, which is white and tender, is much liked by the islanders.

SAIL. See SHIP.

SAILCLOTH, a coarse, strong linen, cotton or hempen cloth used in making sails. The best is made of flax, and combines flexibility with lightness and strength. See SHIP.

SAILFISH, a large predaceous fish (*Istiophorus nigricans*) of the West Indian and neighboring waters, which is closely allied to the sword-fishes and of the same family as the spear-fishes (*Tetrapturus*). It reaches a length of six feet, has an elongated, much compressed body, covered with elongate scutes, and a powerful, deeply forked tail, while the dorsal fin is, relatively, of huge size and deeply notched outline, well simulating the appearance of a ship under sail as it appears above the water when the fish glides along the surface as it frequently does. The bones of the nose are prolonged into a "sword," not so long as that of the sword-fish, but sharper, and they are an effective weapon in a school of small fish.

SAILING. See NAVIGATION; SHIP; SAILING VESSELS.

SAILING VESSELS. The first vessel of which history gives any description is the *Ark*, as built by Noah., Its proportions possess some interest, because, though not intended for a voyage, it may be inferred that it was constructed to float with as little motion as possible, considering that it "went upon the face of the waters" for about five months. Assuming a cubit to be about 21 inches, its length was 525 feet, its breadth 87 feet 6 inches and its depth 52 feet 6 inches. Its length is thus seen to have been six times its breadth, which proportion is about an average of all types of vessels. Its draft of water must have varied greatly during the period of its occupation, as 12 months' provisions must have formed a very large proportion of the original weight, and these must have been gradually consumed. It had three decks; but was fitted with neither masts, sails nor rudder.

Ancient History.— The paintings and sculptures, as the early records of Egypt, show regularly formed boats constructed of sawed planks of timber, propelled by numerous rowers, and also by sails. These vessels were long galleys with one mast and a large square sail, which was sometimes of linen and sometimes of papyrus. The oldest authentic record as to these sailing vessels is the illustration on an Egyptian amphora (in the British Museum), judged by the best authorities to have been made about 6000 B.C. It is to be noted, however, that these boats could sail only with the wind, and that the science of tacking and sailing against the wind was unknown for, literally, thousands of years, during which vessels sailed if the wind was favorable, and unshipped the mast, and set the oarsmen at work when it was contrary. The Hebrews in the time of Solomon must have possessed vessels of considerable size, as mention is made in the sacred writings of that date of stately ships, and of voyages made to bring trees of considerable size to be used in the building of the temple. The Phœnicians about 1200 B.C. had sailing vessels which did not differ in any important respect from those of the Egyptians, but they seem to have developed the art of sailing to a considerable degree. Later they were connected with the Hebrews in their maritime expeditions, and this people appear to have been the most enterprising in navigation of all the nations of antiquity. Herodotus tells us of their feat of circumnavigating the continent of Africa in 604 B.C. They started from the Red Sea, passing Ophir on east coast of Africa, then rounded the Cape, and keeping by the west shore they entered the Mediterranean Sea through the Straits of Gibraltar, and arrived in Egypt in the third year of their expedition. Little doubt exists of the Phœnicians having been the discoverers of the art of sailing, as their skill in evading Nebuchadnezzar at the siege of Tyre for 13 years shows that they possessed more than a superficial knowledge of navigation. They were also engaged in concert with other nations in wars with the Greeks: and it was from them the latter nation learned in their conflicts what they knew of ships and navigation. The fact of the Grecian mariners making use of the screw pump to discharge water from their vessels' holds would lead to the conclusion that their vessels were no mere sloops; yet the relative placidity of the waters in which they sailed suggests that their vessels were sailing boats rather than sailing ships. An evidence of the want of strength in the construction of these ancient vessels is the fact of their being bound around the outside with heavy ropes. They were sometimes carried as part of the vessel's outfit, and used as necessity required. Out at sea and in heavy weather, they were made use of. There were sometimes as many as 8 or 10 bands running fore and aft of the vessel. The Greek warships were strengthened to withstand the shock of ramming by the addition of longitudinal timbers secured to the exterior of the hull. At this period it was the custom of mariners to draw their fragile vessels out upon the shores at the approach of autumnal storms, and to leave them there till mild weather came again in the spring.

Roman Galleys.— The Romans in the early stage of their history paid little attention to navigation, until it was forced upon them by the necessity of competing with their rivals, the Carthaginians. The galleys of this period ranged from a single bank up to five banks of oars. The oars in these large galleys were arranged in sets or banks; the number of these could be increased to any extent by giving increased length to the galley. The trireme, or three-bank galley, appears to have been generally open, in the waist where the rowers sat, with decks or platforms at both ends for the soldiers. The galleys of greater size than the three tiers appear to have been always decked

vessels. At the time of the First Punic War the Roman fleet is said to have consisted of 330 vessels, each containing 300 rowers and 120 soldiers. The triremes were each 105 feet long and 11 feet wide, and the quadriremes were 125 feet by 13 feet.

Viking Ships.— Of much sturdier build were the ships of the Norsemen, designed to sail the turbulent waters of the northern seas. The custom of burying noted Vikings in the boats which they commanded has preserved under great burial mounds a number of specimens of these early ships. One of these, found in England, was 48 feet long, 9 feet 9 inches beam and 4 feet depth of hold. Another, unearthed in Norway, was 45 feet 6 inches in length, about 14 feet beam and 4 feet deep. The famous Gogstad ship, exhumed in 1880, was 79 feet 4 inches long, 16 feet 6 inches beam, 6 feet deep amidships and 8 feet 6 inches deep at bow and stern. All of these vessels were of oak, clinker-built and caulked with moss or hair of some animal. They have been decided by antiquaries to belong to the 3d century. The remains of a much larger vessel, prodigious for its time, were found in the Orkneys. It was 130 feet in length and had a depth of hold of about 15 feet. This vessel is regarded as belonging to the latter part of the 9th century, and is believed to have been one of the ships with which the Vikings conducted raids on the coast of England. These raids served to stir Alfred the Great (848–890) with a spirit of rivalry and he proceeded to build ships twice as large as those of the enemy, but of the same type. It is noteworthy, however, that he failed to find seamen of experience in his own kingdom, but was compelled to hire them in Holland. Under Athelston, the grandson of Alfred (895–941), it is known that a considerable merchant trade was carried on with France and Flanders by English sailing ships; and it is recorded in history that King Edgar (944–975) had a fleet of some 4,000 sailing ships stationed as a guard around the entire coast of Great Britain.

The expedition of Richard Cœur de Lion (1157–99) to the Holy Land led to the remodeling in some respects of the English sailing craft, through the adoption of some of the developments in construction of the ships of the Mediterranean, which were much larger as to hull, and carried taller masts and a larger area of sail. But these improvements in the English ships were chiefly those for warlike purposes and the more important features of the Mediterranean vessels seem to have been overlooked, or at least neglected, for they did not appear in the English ships until the 15th century.

Merchant Ships.— It is generally supposed that ships intended only for merchant purposes were first built by the Genoese, and that not until the beginning of the 14th century were sails first used by that people. The fishing boats were the small beginning from which sprang the sailers and the larger sail vessels of a later period. But it is an indisputable fact that long before this time ships of three decks and of 600 or 700 tons, of Italian build, were sailing the Mediterranean with both freight and passengers. In England, as early as 1344, many vessels of this character were in service. In the middle of the 15th century many large vessels were built in England, but they were mostly naval vessels. Prior to this the compass had come into more general use, and it was now possible to engage in longer voyages. The discovery of America and the passage around the Cape of Good Hope were early fruits of these improvements. The Portuguese employed vessels of small size in their voyages of discovery, but the Spaniards built larger vessels and long maintained a superiority in this respect. England was far behind the Peninsular nations in commercial enterprise at the opening of the 16th century, but under the reign of Queen Elizabeth (1533–1609) the merchant marine of England was relieved of many oppressive laws and the coasting trade of the British Isles was reserved exclusively for British ships. And not only did the coasting trade flourish, but English shipping began to contest successfully with that of Italy, Spain and Portugal for the carrying trade of the world. Moreover, a distinct change appeared in the design of English ships in the abandonment of the high Spanish poop and forecastle prevalent on the vessels which sailed the Mediterranean. Meanwhile the French had not been idle, and while their merchant ships were few and small, they were building war vessels which compared well with those of Spain and England, though leaning in type toward the Spanish models. The *Cordeliere* of 700 tons and the *Grand Louise* of 790 tons were as large as any ships afloat.

The Spanish Armada, which visited English waters in 1588, comprised 130 sailing vessels of all sorts, with a total tonnage of 60,000. Some 60 of these were galleons of the largest type. The wrecking of one of them on the western coast showed it to be of 900 tons. At this time the "treasure-ships" of Spain, 100 feet in length and 34 feet in breadth, were making regular voyages across the Atlantic for the gold and silver of the New World. More light on the shipping of those days is afforded by the record of the carak *Madre de Dios*, captured by the English in 1592. This vessel was 165 feet in length, 46 feet 10 inches beam and drew 26 feet of water. The height of her mainmast was 121 feet and her main yard was 106 feet long. Her capacity was 1,600 tons, by far the largest known up to that time.

The Dutch ships of this period were distinctive in model owing to the shallow waters in which they sailed. They were low and of comparatively wide beam and large sail area. For their smaller craft the Dutch had already developed the fore and aft rig, and were using both the sprit sail and sprit topsail on their galleons. It is to be noted in passing that the Dutch galleons were at this time determinedly engaged in the first polar explorations on record — the endeavor to find a northeast passage to China (1594, 1595 and 1596). From the earliest times the Dutch had been fishermen and accomplished navigators, and while their war fleet was small, their merchant fleet grew apace and by the early part of the 17th century they controlled the coasting trade as far south as Portugal and were successfully monopolizing the East India trade of Britain. The English merchant marine was in a very depressed condition. Internal discords had put a damper on the enterprise of the merchants, and as the island was not yet famed for its manufactures,

commerce dropped with every disaster to trade. The British East Indies Company was formed under the auspices of Queen Elizabeth (1599) and some great ships were built for this trade, the largest being the *Trade's Increase* of 1,200 tons. From this time onward the British made every effort to control the shipping trade of the world. The Dutch were their principal competitors, and had, without doubt, the best-built and best-manned fleet and had established colonies in South America, to which their ships made regular voyages. The British policy was to build larger ships than those of any other nation and in this they surpassed the Dutch, but the French excelled them. The *Sovereign of the Seas,* built in 1637, was the largest of the British ships at this period. She was 170 feet long, 48 feet beam and 19 feet deep and measured 1,683 tons. The largest Dutch ships at that time were the *White Elephant* of 1,482 tons and the *Golden Lion* of 1,477 tons. The French had the *Soleil Royal* of 1,946 tons and the *Royal Louis* of 1,800 tons. The English continued to build larger vessels and in the early 18th century had the *Royal George* of 2,047 tons, and in 1765 launched the *Victory,* Nelson's famous flagship of 2,162 tons. The capture by the British in 1792 of the French *Commerce de Marseilles* of 2,747 tons aroused new emulation of the French shipbuilders, and the direct result of this impetus was the *Caledonia,* launched in 1808, a vessel 205 feet in length and of 2,616 tons.

The First American Ships.— This continent having been fitted by nature in supplying it with an abundance of good timber, vessels have been built upon our shores from the first year of actual settlement. The first ship constructed was for the purpose of carrying a small band of settlers back to England, who were discouraged with their prospects after the first winter. The vessel was built in 1607 at Stage Island, near the mouth of the Kennebec River in Maine. It was a staunch and excellent little vessel of 30 tons, a two-master, named *Virginia.* She is believed to have been about 30 feet long, 13 feet beam and 8 feet deep. She subsequently made a number of voyages between America and England. The next vessel built was at New York in 1614 by Capt. Adrien Blok, who had lost his ship *Tiger* by fire while lying in Manhattan River. His new vessel was named *Onrust* (*Restless*) and was 38 feet keel, 44½ feet long over all and 11 feet beam. This vessel was employed for several years in exploring the Atlantic Coast from the 38th to the 42d degree of latitude. Block Island was visited during one of the excursions and took its name from Adrien Blok. With the exception of fishing boats and shallops, there is no record of the construction of any other boats until 1631. In that year the 30-ton bark *Blessing of the Bay* was launched at Medford, Mass., for the use of the Massachusetts colony. In the course of the season this vessel made several coasting trips and soon after visited Manhattan Island and Long Island. It is thought the vessel was lost with a load of furs and fish in 1633 off the capes of Virginia. By 1635 there were six of these small sailing vessels regularly employed in the trade with England. In 1636 the *Desire* of 120 tons was built at Marblehead and put into the fishing business.

Early Shipbuilding.— Shipbuilding at this time appears to have received its impulse from the same cause which threw the colonists upon their own resources for the supply of many of the necessaries of life. They had been hitherto supplied with all but their corn and fish by the many emigrant ships which had yearly added to their numbers. A suspension of this emigration, brought about by the civil wars in England, and the diminished intercourse caused thereby, left them dependent on mercantile enterprise alone, which the state of navigation then rendered precarious in the extreme. Governor Winthrop then said, "The general fear, of the want of foreign commodities, now our money was gone, and things were like to go well in England, set us on work to provide shipping of our own: for which end Mr. (Hugh) Peter, being a man of very public spirit and singular activity for all occasions, procured some to join for building a ship at Salem of 300 tons, and the inhabitants of Boston, stirred by his example, set upon the building of another at Boston of 150 tons. The work was hard to accomplish for want of money, etc., but our shipwrights were content to take such pay as the country could make." He speaks in another place of the *Trial* of 160 tons, as the first ship built at Boston. She sailed for Bilboa on 4 June 1642, laden with fish, "which she sold there at good rate, and from thence freighted to Malaga." Thus early began the profitable trade to distant ports from New England, and by 1676 the colony of Massachusetts owned 200 vessels of from 30 tons to 50 tons; 200 of from 50 tons to 100 tons, and 30 above 100 tons. An early and successful prosecution of the business of shipbuilding could have been more reasonably expected of none of the first colonists of America than of the settlers of Manhattan. Holland was at that period, and long after, in the enjoyment of the carrying trade of the world. Though not possessed of a foot of timber, she built and armed more ships than all the rest of Europe. Planted by this commercial people, and by merchants and capitalists of Amsterdam, then the mercantile metropolis of Europe, exclusively for the purposes of trade, it appears somewhat surprising that the facilities afforded by the new territory for shipbuilding were not made available to a greater extent by the parent nation. But the administration of a privileged mercantile association, such as the West India Company, which, in 1621, was invested with a monopoly of its trade, was unfavorable to the development of the resources of the colony. About 1630 the carrying trade between Holland and America, and the trade with Brazil, where the company had sustained losses equivalent to "one hundred tons of gold," were thrown open to the colonists and private ships were for the first time entered at Amsterdam and publicly advertised for New Netherlands. Other restrictions, which had fettered commerce, were soon after removed and the trade of the world with the exception of that to the East Indies, and the trade in furs, were open to the colonists. In 1678 the shipping owned in the port consisted of three ships and 15 sloops and other small sailing vessels. In 1694 the shipping had increased to 60 ships and 102 sloops. This was on account of a monopoly of exporting flour and biscuits from the

province. South of New York during colonial times there was little or no construction of vessels. New England developed her large shipping interests through the fisheries that were at her door and the coasting trade maintained by the latter extended as far south as the West Indies during these early days. It might be said the fisheries were the cause of the large merchant marine of New England. Between the years 1674 and 1714 a total of 1,332 vessels were registered as built in New England yards, in many cases by men drawn from English shipyards. Of those built, 239 were sold to foreign owners.

The Schooner.— In 1745 Andrew Robinson of Gloucester, Mass., built a vessel with a square stern, which was fitted with two masts, bearing a sloop sail on each, and a bowsprit with jib. She was sharp on the bottom and on being launched sped over the water so fast from the impetus gained by descending from the ways as to elicit from a bystander the remark, "See how she scoons." Scoon was a word used by plain people to express the skipping of a flat stone over the surface of the water when skilfully thrown; and the builder of the vessel, having been somewhat at a loss for a name for the new rig, seized upon the trifling incident and replied, "A scooner let her be," and two-masted vessels, with jibs, and fore and aft sails have since been called by that name. This vessel was probably used in the fisheries. The schooner proved to be a very economical vessel to run, with fewer men to her sail area than any other type of sailing vessel. The largest schooners were those sent to the Grand Banks, and for many years after 1800 about 70 sailing vessels were sent annually to the Grand Banks, chiefly from Cape Ann. These early vessels were from 20 to 40 tons.

Colonial Merchant Marine.— Before the Revolutionary War our merchant marine was in a prosperous condition and took nearly first rank with us. By 1760 from 300 to 400 trading vessels were being built annually in the different provinces. In 1769 alone, 389 ships with a tonnage exceeding in the aggregate 20,000 tons were turned out of American shipyards. Of these, 113 were square-rigged and a large proportion of the remainder were schooners. Few of these exceeded 200 tons. During the War of the Revolution the whaling and fishing fleets suffered seriously from raids by English cruisers. Foreign trade in our vessels suffered the same fate. A large part of the merchant and fishing fleet was employed during the war in privateering and it became a profitable field for them at times, as small armed sloops frequently captured large merchantmen under the British flag. The larger privateers built during the war, when the conflict was over, were converted into merchantmen and sent to the East Indies to trade. The Baltimore-built schooner took high rank as a privateer during the war. The 16 years that followed ending with the War of 1812 were perilous times for American shipping. England excluded us from a profitable trade with the British West Indies and the same interests led to the searching of our merchant vessels for British subjects, the capture and confiscation of our vessels and cargoes and a detention of a large number of them for evasions of the British law. The American merchant fleet which had increased to a total registry of 848,307 tons in 1807 fell to 769,054 tons in 1808, under the restrictions of the American embargo laid at the insistence of Great Britain. The repeal of the embargo in 1809 brought the tonnage of the merchant fleet to 910,059 and in 1810 it reached its high-water mark for many decades to come at 984,269 tons. Then came on the War of 1812 that lasted for nearly three years, during which many privateers were constructed that subsequently pursued the peaceful pursuit of trade. A change in the form of our sailing vessels now began to appear, giving them better entrance lines, and cutting off those high poop decks that had been such a fixture on large vessels for many years.

The Carrying Trade.— Prior to the War of 1812 our coastwise trade was carried on by no larger sailing vessels than those that were schooner rigged, while our foreign trade was most largely carried on in foreign-built bottoms. Before 1812 a few sailing packets, or vessels carrying both passengers and freight, were brought into the transportation business, and cleared from port on regular days in each month, and were operated between special points only. At this time, however, there were many American-built whalers making three-year voyages to the Pacific from Massachusetts harbors and not a few had gone as far as Bering's Sea. The average tonnage of these daring vessels was less than 300 tons. When the war ended there were only a few small British ships in the packet service between England and America, and very few between America and other parts of the world. Soon after the peace, however, a large number of lines came into existence as a natural outgrowth of the rush of emigration from Europe to America, and the general expansion of ocean travel and trade. The carrying of passengers was a profitable business and there was considerable competition among shipping merchants to get the most business for their vessels. None but the best and finest vessels could be used in this trade and the old-fashioned freighting vessels with their small cabins and houses and poop decks, were subjected to many changes to adapt them to the passenger business. The merchants at most all our coastwise ports, from Portland, Me., to New Orleans, La., soon saw the advantage of these packets for our coastwise trade and regular established lines were soon in operation that remained as carriers until the coastwise steamship lines began operations in 1847, when these lines of sailing vessels gradually withdrew from business. In this trade brigs, schooners and barks were used, while in the foreign service ships and barks only were placed in service.

Packet Lines.— It was at New York the packet business between Europe and America mainly centred. There were lines from other ports, but New York was the pioneer, always kept the lead and had the largest number and finest vessels for the service. In 1816 Isaac Wright and Company of New York founded the famous Black Ball Line, so called from the round black circle in a white field, which was adopted as the pennant of the ships. There were at first four vessels in this line, each of 400 tons, and named *Pacific, Courier, Amity* and *James Monroe.* This line was subsequently owned by Goodhue and Company, Charles H.

Marshall and others, and a dozen other ships added, from 300 to 500 tons burden. They were placed in the Liverpool trade and sailed once a month at first and during the first nine years the average time in voyages to Liverpool was 23 days and for returning home 40 days, but one of the later ships, the *Canada*, the fastest of them all, once made the outward voyage in 15 days and 18 hours and held for a long time the average record of 19 days outward and 36 days homeward trips. A London line followed the Black Ball line and then a Havre line was started. In 1821 a second Liverpool line was established from New York by Byrnes, Trimble and Company, known as the Red Star line, consisting of the *Manhattan, Hercules, Panther* and *Meteor*, sailing once a month, and soon after Fish, Grinnell and Company, afterward Grinnell, Minturn and Company, founded the Swallow Tail line with four packets, making from New York at this time, one sailing for Liverpool each week. In 1830 the passenger fare in the cabin from Liverpool was $180, including beds, bedding, wines and stores of every description. The London packets now sailed twice a month and the Havre line had three sailings a month. There were also at this time sailing packets to South America and Mexican ports. In 1830 there were 1,510 arrivals at New York from foreign ports, of which 382 were ships, 28 barks, 714 brigs, 376 schooners, 8 sloops, 1 ketch and 1 felucca. Of these, 1,366 were American, 92 British, 7 Spanish, 12 Swedish, 2 Hamburg, 5 French, 8 Bremen, 6 Haitian, 9 Danish, 2 Brazilian, 2 Dutch and 1 Portuguese. The number of arrivals in 1829 was 1,310, and passengers, 16,064. In 1823 John Griswold established a London line of four vessels, that had been increased by 1837 to 12 vessels. These vessels down to 1845 were one- or two-decked vessels, and had increased in size from 900 to 1,000 tons. The between deck space, aft, was divided into cabins for the passengers, the middle portion was fitted up with kitchens, pantries, etc. The steerage passengers and crew were placed forward. After 1830 there were frequent sailings of rival packets, transient, but all American, from Boston, New York, and Philadelphia to Great Britain and other parts of Europe. All the ships sailed with great speed and made the run across the Atlantic in excellent time. The *Red Jacket* once ran from New York to Liverpool in 13 days 11½ hours. The *Mary Whiteridge* made the voyage from Baltimore in 13 days 7 hours; but the usual time was 19, 20 or 21 days to Liverpool and from 30 to 35 days homeward. English steamers were sent out in 1838 and 1840 to compete with these packet lines; but the steamers did not at first make much better average time on a voyage than the packets, but in the course of a few years the increase in speed and their additional carrying capacity gave them an advantage and the packets could no longer successfully compete with them.

Clipper Ships.—After the packets came the clipper ships, vessels intended primarily for freighting, and built to secure the highest possible speed when laden with cargo. The packets were the fast sailers from 1816 to 1845, but after the latter date there grew up various branches of trade in which a quick delivery was as important for commercial purposes as it was for the passenger trade. For instance, there was the tea trade from China to the United States, in which speed has always been considered essential. The cargoes consisted of teas, spices, coffee, dried fruits, etc., which were liable to deteriorate in a long voyage of four months to the home port, and to shorten the voyage as much as possible was desirable for many reasons. There were no telegraph lines and ocean cables in those days and the uncertainty of the markets made fast trips home from the East Indies very important. Merchants had repeatedly suffered heavy loss, sometimes business ruin by the decline in eastern goods brought home by ships during their absence on the voyage out and back, and good ships were, therefore, always required in that trade. The first clipper, the *Scottish Maid*, was built in 1839 in Great Britain. She was a schooner of 150 tons and proved very fast and continued in service for 50 years. The first American clippers were built at Boston and Medford. These were small schooners, the *Angola* of 90 tons and the *Zephyr* of 150 tons. They were used in the opium trade. The pioneer of the large clippers was the *Helena*, of 650 tons, whose dimensions were 135 feet length on deck, 30 feet 6 inch beam and 20 feet depth of hold, built by William H. Webb. She came out in 1841 and was constructed for A. and N. Griswold for the China trade. She was a good sea boat and a very fast sailer for her day, making many fast voyages between China and other East Indian countries and New York. Following the *Helena* came the *Rainbow* of 750 tons, built by Smith and Dimon in 1843 for Howland and Aspinwall. She was the first of the extremely sharp type and at the time was claimed by her captain to be the fastest ship in the world. Very few sailing ships since have equaled her records. This vessel made the voyage to Canton and return home in six months and 14 days, having spent three weeks of the time in loading and discharging cargo. The *Helena* and the *Rainbow* brought about a great change in this type of vessel. They commanded better prices for freights than sloop ships, and in every way proved desirable. Then in 1844 followed the *Montauk* of 540 tons for William S. Wetmore, built by William H. Webb. Then A. A. Low and Company had Brown and Bell construct for them the *Howqua* of 706 tons, a very fast and fine vessel, which made a voyage from Shanghai to New York in 84 days. The owners of the *Rainbow* then had the noted clipper *Sea Witch* of 907 tons, built by Smith and Dimon, with the intention to have the fastest vessel of the type afloat. This vessel had finer under water lines than her predecessors, and may be said to have been the first of that advanced type of fast clipper ships. She made one voyage to California in 97 days; to Hongkong in 104 days; to Valparaiso in 69 days; and returned from Canton to New York in 85 days. Her best 24 hours run was 358 miles, a speed greatly exceeding any steam vessel then existing. The era of fast clipper ships was now fairly inaugurated, and many of this class were now built not only at New York, but at Boston, Philadelphia and Baltimore. Nearly all the early ones did not exceed 1,000 tons register, or about 165 feet long, but competition led to a great increase in size, and every year saw vessels launched that spread more and more canvas, longer, larger and faster than ever, and expressly intended to excel everything that had preceded them in the merchant shipping of the world. In 10 years after the first clipper ship the size of 2,400 tons was reached and there were many built 2,000 tons each.

British Rivalry.— Foreign merchants were by no means idle spectators of what was going on in this country, and in 1846 England began to awake to the new and dangerous rivalry from America. The arrival of the *Oriental*, 1,003 tons, in London in 1850, 97 days from Hongkong, with 1,600 tons of tea, on which she collected $48,000 freight, created a furore. Not a single British ship was her equal in speed or elegance of line and construction. The British Admiralty sought and were given permission to draught her underwater lines in drydock; and a great impetus in the building of fast ships resulted. Alex. Hall and Company of Aberdeen made a specialty of clipper ships, and there were launched from their yard many superior and famous vessels. But the Americans, though hard pressed, were able to maintain the lead, and entitled to the best record ever made by ships sailing under canvas. There were several famous races home from China. Once the British clippers *Chrysolite* and *Stornaway* and the American clippers *Race Horse, Surprise* and *Challenge* engaged in a race from Canton to Liverpool and Deal and arrived at the home ports as follows: At Liverpool, *Chrysolite* in 106 days; at Deal, *Stornaway* in 109 days; *Challenge* in 105 days; *Surprise* in 106 days. The British ship *Challenge* ran from Shanghai to Deal in 113 days, and the American clipper *Nightingale* in 110 days. These races were claimed by both parties; but the Americans kept the reputation of superiority, and several ships were ordered at our shipyards for foreign account. Then shortly after the gold fever broke out in California, and the *John Bertram* of 1,100 tons was built at Boston, Mass., and sent to the Pacific Coast in 1850 by Boston parties. This was the first clipper ship built for the California trade. The *Witch of the Wave* and four others of 1,500 tons each were immediately after built for the same parties. The *Witch of the Wave* made the trip from Canton to Deal in 90 days — 15 days faster than the best previous record, that of the *Challenge*.

Sailing Speed.— The speed of the clippers was remarkable. Six miles an hour was a good average rate of speed for long voyages and nine miles an hour excellent time, especially for a ship loaded with a full cargo of merchandise. Clippers ran across the Atlantic to Liverpool at an average speed of nine miles an hour, spurting at the rate of from 10 to 13 miles with a favorable wind, and on voyages that gave them the advantage of the trade winds they ran for days and weeks in succession at an average speed of from 12 to 15 miles an hour. To sail 300 miles a day was not exceptional. The largest of them all was the four-master *Great Republic*, of 4,555 tons, built by Donald McKay in 1853 at East Boston. The length on load line was 314 feet, beam molded 49¼ feet, molded depth 32 feet. She was burned at her dock before sailing. The hull was afterward rebuilt at Greenpoint, L. I., and was launched at 3,357 tons, being still the largest ship afloat. One of the noted clippers of the day was the *Dreadnought* built in 1853 at Newburyport, Mass. In 1859 she made the voyage from Sandy Hook to Liverpool in 13 days, 8 hours. Fast as the *Dreadnought* was she failed to surpass the records of the *Red Jacket*, a Maine-built clipper of 2,006 tons, of 13 days, 1 hour from Sandy Hook to the Rock Light, Liverpool (1854), and of the *Andrew Jackson*, built at Mystic, Conn., of 1,679 tons, holding the record for the westbound voyage, 15 days from Rock Light to Sandy Hook (1860).

Other record passages of those days which have never since been beaten are the following:

James Baines, 2,515 tons, launched at East Boston in 1854; 12 days, 6 hours, Boston to Liverpool. From Liverpool to Melbourne in the then record time of 63 days; and thence home to Boston in 69 days; making the circuit of the globe in the unequaled time of 132 days.

Lightning, American-built ship of 2,090 tons, Melbourne to Liverpool, 63 days (1853); Portsmouth to Calcutta, 87 days (1857).

North Wind, American built, 1,041 tons, London to Sidney, New South Wales, 67 days.

Mandarin, 776 tons, New York to Melbourne, 71 days.

Mary Whitridge, American built, 987 tons, Liverpool to Baltimore, 14 days, 9 hours (1855).

Marco Polo, American built, 1,512 tons, Liverpool to Melbourne, 61 days (1861).

Thermopylae, British built, 927 tons, London to Melbourne, 60 days (1869).

The record voyages of American sailing ships in the coastwise trade, known as the "California clippers," were:

Flying Cloud, 1,793 tons, New York to San Francisco, 89 days (1851). The same feat was accomplished in 1854 by the same vessel and repeated in 1860 by the *Andrew Jackson*.

Northern Light, 1,021 tons, San Francisco to Boston Light, 76 days, 5 hours (1853).

Comet, 1,836 tons, San Francisco to New York, 76 days (1854).

The best day's run ever made by a sailing ship was 436 nautical miles, recorded by the *Lightning* on her maiden voyage from Boston to Liverpool in 1854. The highest speed ever recorded by a sailing ship was 21 nautical miles per hour, made by the *James Baines* on 17 June 1856.

After 1860 there was no longer any necessity for great size and speed in this type of vessel. Too many ships had been built and a reaction set in that lasted for many years. By 1857 there were from 80 to 100 large ships in the California trade and the rates of freight fell off one-half, and the ships were thrown into the general trade of the world. In the next place, steam vessels, about 1852, had been built to run on all the principal ocean routes and there was no longer any need for sailing vessels to be fitted out with large cabins and roomy passenger accommodations. This ended the career of those fast clipper ships that had such a world-wide reputation from 1850 to 1860. Then the Civil War came on and our foreign trade was cut off for four years. After 1865 the grain trade attracted the larger sailing vessels from all over the world. This type of vessel was no longer an extreme clipper of the former

period, but a handsome, medium clipper of from 1,400 tons for the British ships to 1,600 and up to 2,000 tons register, for the American; capable of carrying a large cargo at a fair rate of speed. The Maine shipyards at this time turned out a large number of strong wooden sailing ships of from 1,600 to 2,400 tons. These vessels continued in the Atlantic-Pacific trade until the American Hawaiian Steamship Line commenced operations in 1900.

Modern Schooners.— The schooner, as previously mentioned, was a distinctively American product of a comparatively early date (1713). It was largely used in the coastwise trade, to the West Indies, to South America and later to Africa, and it may be said has not fallen from favor even to this day. The early vessels were not over on an average 75 tons. When it became necessary to increase the tonnage of the vessel it was thought to be advantageous to increase the power, so three masts were adopted. The earliest date of the building of a three-masted schooner in this country is thought to be about 1831. There were a few more built about 1845, and in 1847 the *Midas* was converted into a three-masted schooner, the *Zachary Taylor* was built at Philadelphia in 1849 and the *Spray* at Wilmington, Del., the same year. The period when this type of sailing vessel had passed the experimental stage appears to have been in 1853 when there were built the *Gardner Pike*, the *James H. Chadbourne*, the *Kate Brigham* and the *E. R. Bennett;* and in 1855 the *Eckford Webb* and the *William L. Burroughs;* and in 1856 the *Hartstein* and the *Cordelia*. The two latter were two-decked vessels and were the largest of the type built for some years. These vessels were used mainly in our coasting trade, as far south as the Gulf of Mexico ports. There were a few more built prior to 1860; the Civil War came on when but few, if any, were built. It was 1868 before three-masted schooners were again constructed, and by 1873 they were the most popular type of our coastwise sailing vessels. The first *four*-masted schooner was the *William L. White*, built at Bath, Me., and completed in June 1880. The Northern lakes also had four-masters immediately after the *William L. White*. Then it was some years before the pioneer *five*-master was constructed in 1888 at Waldoboro, Me., as the *Governor Ames*. The latter was the largest schooner for 12 years, until the *George W. Wells* was built in 1900 as a *six*-masted schooner. The largest of them all was the *Thomas W. Lawson*, built of steel in 1902, as a *seven*-masted schooner. This superb vessel foundered off the Scilly Islands in 1907.

Iron Hull Ships.—Although iron had been used in Great Britain for building hulls as far back as 1829 and came into common use in the early 40's, the first iron hull sailing vessel constructed in the United States was the schooner *Mahlon Betts* of 275 tons, built in 1854 at Wilmington, Del. Then there were none but wooden sailing vessels until the brig *Novelty* was built at Boston, Mass., in 1868, and the bark *Iron Age* constructed in 1869 for Tupper and Beattie of New York. The sloop yacht *Vindex* was then built in 1871 at Chester, Pa., by Reanie Son and Archibold; and in 1879 the yacht *Mischief* was built at Wilmington, Del. The three-masted schooner *Josephine* followed in 1880, being built by William Cramp and Sons Company. Then there came much larger vessels in the *Tillie E. Starbuck*, built in 1883 by John Roach and Son at Chester, Pa.; and in the same year by Gorringe and Company, as the American Shipbuilding Company, the *T. F. Oakes*. These vessels were about 2,000 tons register each.

The world's recorded tonnage of merchant sailing vessels in 1850 totaled 7,701,885; of which 3,396,650 tons were British; 3,009,507 tons American; 674,228 tons French; 298,315 tons Norwegian; 289,870 Dutch, and 33,315 Belgian.

In 1900, with more complete records, the total was 9,167,620, distributed thus: United States, 2,507,042 tons; United Kingdom, 2,096,408 tons; Norway, 1,002,675 tons; France, 636,081 tons; Germany, 593,770 tons; Italy, 568,164 tons; Japan, 320,572 tons; Sweden, 288,687 tons; Finland, 287,154 tons; Russia, 269,460 tons; Greece, 175,867 tons; Denmark, 158,303 tons; Spain, 95,187 tons; Holland, 78,493 tons; Portugal, 43,874 tons; Austria-Hungary, 25,342 tons; China, 20,541 tons.

In 1911, the latest year for which complete figures are available, the total of the merchant sailing marine was 7,454,189 tons, distributed as follows: United States, 2,564,721 tons; United Kingdom, 962,718 tons; Norway, 738,197 tons; France, 624,521 tons; Germany, 510,059 tons; Japan, 451,529 tons; Italy, 410,791 tons; Finland, 327,625 tons; Russia, 254,330 tons; Sweden, 154,968 tons; Greece (1910), 145,284 tons; Denmark, 124,510 tons; Spain, 44,325 tons; Portugal, 43,844 tons; Holland, 42,312 tons; Austria-Hungary, 32,871 tons; China, 15,679 tons.

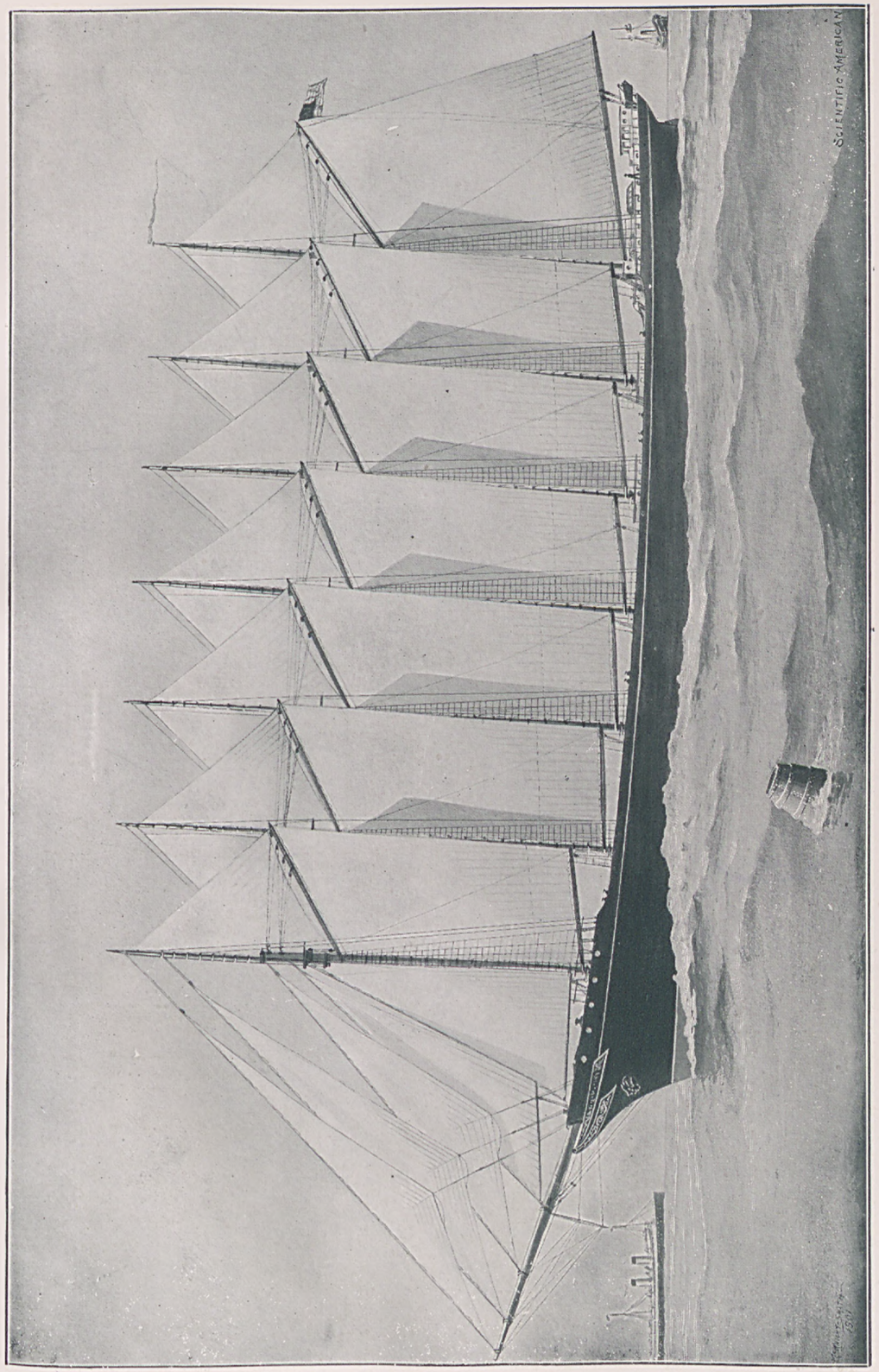
A comparison of decades shows that the zenith figures of the sailing fleets of the several maritime nations were as follows: United States, 1861, 4,662,669 tons; United Kingdom, 1870, 4,577,855 tons; Norway, 1890, 1,502,594 tons; Italy, 1870, 980,054 tons; Germany, 1880, 965,767 tons; France, 1860, 928,000 tons; Sweden, 1880, 461,593 tons; Holland, 1860, 423,790 tons; Greece, 1870, 398,703 tons; Russia, 1880, 378,894 tons; Finland, 1911, 327,625 tons; Spain 1880, 326,438 tons; Austria-Hungary, 1870, 279,400 tons; Denmark, 1880, 197,509 tons; Portugal, 1900, 57,925 tons; Belgium, 1850, 33,315 tons.

A comparison of these figures will give a measurably accurate view of the rise and fall of the sailing vessel in the principal maritime countries.

In the United States the zenith of the building of sailing ships was reached in 1855, when 1,781 vessels, aggregating 510,690 tons, were launched. Of these, 381 were ships, 126 were brigs, 605 were schooners and 669 were sloops.

On 30 June 1917 there were on the register of the United States 134 square-rigged vessels; 82 of these being American built and 52 built abroad. These were 38 ships totaling 77,863 tons; 55 barks, totaling 68,993 tons; 38 barkentines, totaling 37,987 tons, and 3 brigs and brigantines, totaling 940 tons. The materials of which these vessels were built were: Of wood, 81; of iron, 28; of steel, 25.

The sailing vessels of the world, of 100 tons and upward in the year ended 30 June 1922,



THE FIRST SEVEN-MASTED STEEL SCHOONER

Length, 395 feet; Beam, 50 feet; Molded Depth, 34 feet 5 inches; Displacement, 10,000 tons; Cargo capacity, 7,500 tons; Total sail area, 40,617 square feet

were recorded by *Lloyd's Register* as 4,680 in number and of the aggregate of 3,027,834 tons. Of the whole number 1,058 were British; 3,554 Russian; 1,149 American; 190 German; 963 Turkish; 397 Italian; 223 Swedish; 371 French; 136 Norwegian; 200 Danish; 18 Greek; 50 Brazilian; 43 Argentinian and 64 Dutch. By far the largest number are of wood.

In 1914 (the year before the war) only 35 sailing vessels, 9,195 tons in all, were launched in British shipyards. In the United States 21 were launched, 4 of steel; totaling 3,262 tons; and 17 of wood, totaling 14,934 tons. The entire output of sailing vessels for the world in 1914 was 225 craft, aggregating 67,368 tons.

See also MERCHANT MARINE OF THE UNITED STATES; NAVAL ARCHITECTURE; SHIPBUILDING; SHIP SUBSIDIES; SHIPPING OF THE WORLD.

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J. H. MORRISON,
Author of 'History of American Steam Navigation.'

SAILOR'S CHOICE, the name of several excellent food fishes taken on the eastern and southeastern coasts of the United States, which are of small size and belong to the family of grunters. The best known, probably, is *Orthopristis chrysopterus,* also called pigfish, and especially common in the Gulf of Mexico. It is regarded as the best pan-fish of the region.

SAILOR'S CREEK, Battle of, the last great battle of the Civil War in the East. Sheridan says that it was «one of the severest conflicts of the war . . . so overshadowed by the stirring events of the surrender, three days later, that the battle has never been accorded the prominence it deserves.» When General Lee abandoned Richmond and Petersburg on the night of 2 April 1865, he ordered the concentration of his army at Amelia Court House, about 30 miles west of Petersburg, and it had collected at that point by noon of the 5th. On the night of the 5th Sheridan's cavalry and the Second, Fifth and Sixth corps of the army of the Potomac were at or near Jetersville, under orders to march early next morning on Amelia Court House. General Meade began the advance at 8.30 A.M., and when four miles out of Jetersville, Humphreys' Second corps, on the left, discovered that Lee was moving westward, passing by the flank of the Union army. The advance on Amelia Court House was suspended, and the army faced about; the Second corps was ordered to move on Deatonsville; the Fifth through Painesville, on the right of the Second; and the Sixth through Jetersville to the left of the Second. Sheridan's cavalry moved on the extreme left parallel to the Confederate line of retreat, impeding the march of the column wherever practicable, but Longstreet's corps succeeded in reaching Rice's Station, on the Lynchburg road, where he awaited the corps of R. H. Anderson, Ewell and John B. Gordon, the last-named commanding the rear-guard. The Second corps was checked at Flat Creek by the destruction of the bridge, but, soon repairing it, overtook Gordon and kept up a running fight with him for 14 miles, carrying several lightly intrenched positions, and capturing prisoners, colors, and wagons. The pursuit continued to Parkinson's Mill, on Sailor's Creek, where Gordon made a stand, but was soon driven across the creek, losing three guns, 13 colors, several hundred prisoners, and a large part of the trains of Lee's army. He attempted another stand beyond the creek, but fell back as Humphreys crossed, and marched for High Bridge. Pursuit ended at night. During the day the Second corps had captured 1,700 prisoners, four guns, 13 colors, and several hundred wagons and ambulances. While the Second corps was engaging Gordon, the Sixth corps, with the cavalry commands of Merritt and Crook, had come up some three miles to the left and overthrown the corps of R. H. Anderson and Ewell. Custer's division had interposed between Ewell and Gordon, destroying 400 wagons and taking prisoners and 16 guns; and Crook, moving rapidly to the left, found R. H. Anderson's command posted on high ground behind breastworks running across the Rice's Station road, and sent a dismounted brigade to take possession of and form across the road, thus cutting Anderson off from Longstreet. Ewell now proposed to Anderson that they make their way through the woods, around Sheridan's left, and get to Longstreet; but before anything could be done both were attacked. The Sixth corps had opened its artillery upon Ewell's 3,600 men, to which there was no reply, as Ewell was without artillery; and about 5 P.M. two divisions advanced, crossed Sailor's Creek, and attacked Ewell, who made a most determined resistance and, massing his troops, broke the centre of the Union line, but was checked by the artillery-fire from beyond the creek. The two divisions of the Sixth corps — Seymour's and Wheaton's — wheeled to the left and right respectively, enveloping Ewell's flanks; Stagg's cavalry brigade charged his right; and at the same time Merritt's and Crook's cavalry charged and routed R. H. Anderson's 6,300 men, killing wounding and capturing about 2,600. Ewell, now completely cut off and surrounded, surrendered his entire command. About 250 men of Kershaw's division, serving with him, escaped. Seven general officers were included in the surrender. The total loss of Lee's army was not less than 8,000 men. The Union loss did not exceed 900. Longstreet, who had remained at Rice's Station during the day, waiting for Anderson, Ewell and Gordon to unite with him, marched as soon as night set in, with Fields', Heth's and Wilcox's divisions, for Farmville. (See FARMVILLE AND HIGH BRIDGE). Consult 'Official Records' (Vol. XLVI); Humphreys, 'The Virginia Campaign of 1864-65'; Walker, 'History of the Second Army Corps'; Grant, 'Personal Memoirs' (Vol. II); Sheridan, 'Personal Memoirs' (Vol. II).

E. A. CARMAN.

SAILORS' SNUG HARBOR, a home for aged sailors on Staten Island, N. Y., established by Captain Richard Randall in 1800. The home is under government supervision and is in charge of a naval commander.

SAINFOIN, sān'foin, or **ESPARSETTE,** a leguminous plant (*Onobrychis sativa*), originating in the Mediterranean countries and cultivated for centuries. The stem is about two feet high, with pinnate leaves composed of small leaflets. The pea-like flowers are rather large and of a showy pink color, and are disposed in short spikes, on long axillary peduncles. It is nutritious fodder, well liked by livestock, especially sheep. It makes good hay, and will grow on light, warm, chalky soils, where other pasturage does not thrive; the roots are long-lived and are useful for binding light soils, while the foliage not only shades the pastures, but makes a good crop for plowing under. It is also recommended as a honey-producing plant for bee pastures.

SAINT, a person eminent for piety and other virtues. In the books of Scripture, both the Old and the New Testament, the whole body of the faithful people are called saints (2 Chron. vi. 41; Ps. xxxi, 3; Hebr. xiii, 14, «Salute all the saints»; Eph. i, 1, «the saints at Ephesus.») It is customary to give the title saint to all the apostles, evangelists and other holy persons, men and women, named in the New Testament, to most of the Fathers of the Church, to all the martyrs. In the Church of Rome the title of saint is formally and authoritatively bestowed on servants of God who in their lifetime were eminent for their Christian virtues and graces, and whose sanctity has been proved by miracles after their death (see CANONIZATION; BEATIFICATION); but thousands of saints are honored by that church, who lived in early times before the process of canonization was thought of. Intercession by the saints in heaven and invocation of the saints are articles of belief in the Catholic Church, Eastern and Western, as also in the schismatical Eastern churches: but that doctrine is repudiated by all the Protestant churches. The teaching of the Church of Rome, as proclaimed by the Council of Trent, is that the saints reigning with Christ «offer to God their prayers on behalf of men»; that it is good and useful «to call upon them with supplication,» and, in order to obtain benefits from God through Jesus Christ, «to have recourse to their prayers, help and aid.» Here the Church's doctrine regarding both intercession and invocation of saints is defined. Catholic divines find full warrant for this belief in the Christian sacred books; for the doctrine of intercession, in 1 Cor. xii, 12, where the unity of the Christian society is enforced; in James v, 16, where the prayer of the righteous is lauded; in Eph. vi, 18, and 1 Tim. ii, 1, where Saint Paul sets such store on the prayers of his fellow Christians; and it is asked: Can it be that the souls which have gone to God no longer exercise this kind of charity for their brethren on earth? If Scripture were silent on this question, the practice of the Church in all ages would suffice to remove all doubt as to the Apostolic origin of the belief in the intercession of saints. For the doctrine of the invocation of saints, theologians quote the word of Jesus Christ, that the angels in heaven rejoice when a sinner repents of his sin (Luke xv, 7). It were superfluous to cite the usage of the Catholic Church regarding invocation of saints: it began with the beginning of Christianity itself.

SAINT, The ('Der Heilige'). 'The Saint,' by Conrad F. Meyer (1879), is a short novel, about the length of 'Silas Marner,' centred around the great quarrel between Henry II and his Chancellor and Primate of England, Thomas Becket. In a broad sense based on history, its psychology is fancifully developed from a mediæval legend found by Meyer in 1853 in Thierry's 'Conquest of England' (Book IX), according to which Becket was the son of an Englishman and of the sister of the Kalif of Cordova. The story of Henry's amours with beautiful Rosamond Clifford in the hidden bower suggested the secret palace in which Meyer's Becket rears his daughter Grace to save her from royal lechery. The accidental slaying of Grace after her seduction by the king inspires in Becket a deep-laid plot for revenge under the veil of pretended loyalty and later of saintly devotion when he becomes Primate on Henry's nomination, whereby he drives the king to alternate fits of despair and fury over the loss of political advantages and of the love of his queen and sons. The tragic ending is historical.

The story is put in the mouth of a Swiss bowman, who is supposed to have come on his wanderings to London, where he entered the service of the king and was a minor actor in all the events he relates. The style is vivid, swift and powerful, and the diction of wonderful force and color, suggestive of a Gobelin tapestry, or as Keller said, «brocade.» It is Meyer's most finished production, possibly his best. The English reader will find it curious to compare it with Tennyson's 'Becket.' Consult 'Der Heilige' (66th ed., Leipzig 1913); American School Edition (ed. Eggert, New York 1907, with critical introduction); Frey, Adolf, 'Conrad Ferdinand Meyer' (Stuttgart 1900); Credner, Karl, 'C. F. Meyer, Der Heilige' (Berlin 1899); Langmesser, 'K. F. Meyer' (Berlin 1905).

CARL E. EGGERT.

SAINT ACHEUL, France, archæological site near Amiens which has given the name *acheulian* to the paleolithic deposits discovered there, containing flint implements evidencing human industry at a time corresponding to the second glacial period in France.

SAINT ALBANS, âl'banz, England, in Hertfordshire, 20 miles northwest of London, an ancient borough and market-town, standing on a height above the river Ver. Its abbey is one of the most remarkable Christian temples in England. Only a gateway remains of the original abbey, built in 793 in honor of Saint Alban, the first British Christian martyr. The present abbey has been so often extended and altered that it represents in its architecture many styles and various epochs of history, from the time of the Romans to that of Henry VII. It has the form of a Latin cross, with a length of 547 feet and breadth of 206 feet. Its tower has an elevation of 146 feet, crowned with battlements. Other churches are Saint Michael's, 10th century; Saint Stephen's, with some good Norman features, and Saint Peter's, whose nave is of the Early Perpendicular. There is an Edward VI grammar school, and of modern buildings those deserving notice are the corn exchange, courthouse, prison, baths and public library, besides benevolent institutions, including hospitals and almshouses. The chief industries are silk manufacture, straw-plaiting, and there are breweries and iron foundries. Two battles were fought between the houses of York and Lancaster near Saint Albans; in that of 1455 Richard, Duke of York, defeated Henry VI, and in 1461 Margaret of Anjou defeated the army of York, commanded by Warwick. Southwest of the present city stood the ancient Verulamium, one of the oldest towns in Britain, on Watling street. In the abbey the printing press was set up on which the first English translation of the Bible was printed. Nicholas Breakspear, the only English Pope, was born near Saint Albans. Pop. about 17,000.

SAINT ALBANS, Vt., city, county-seat of Franklin County, on the Central Vermont Railroad, in the northwestern part of the State, about 45 miles north-northwest of Montpelier, the State capital, and three miles from Lake Champlain. It was settled in 1763 and chartered as a city in 1897. In 1864 the town was raided by a band of Confederates who entered the United States from Canada. In 1866 a number of Fenians, who were planning an invasion of Canada, made Saint Albans their headquarters. The city is on a plain about 390 feet above sea-level and 373 feet above lake-level. The scenery is most pleasing; to the east are the Green Mountains, and on the west may be seen the Adirondacks. The city is in an agricultural region in which considerable attention is given to dairying. The chief manufacturing establishments are creameries, railroad shops, machine shops and flour and grist mills. There are large shipments of farm and dairy products. Saint Albans contains the Warner Hospital, the Warner Home, Villa Barlow Convent, an academy; Saint Mary's Academy, public and parish elementary schools and a public library. Pop. (1920) 7,588.

SAINT ALBANS, W. Va., city situated at the confluence of the Coal and Kanawha rivers, 12 miles from Charleston, Kanawha County, on the Chesapeake and Ohio, the Coal River and the Kanawha and Michigan railroads. It is situated in a great natural gas field. The city has lumber factories, a large chemical plant, electrical supply factory, powder plant and projectile and armor plants. The two local banks have combined capital of $55,000 and a combined surplus of $30,000. The value of taxable property is about $2,500,000. The chief public buildings are the city hall, Presbyterian, Northern Methodist, Southern Methodist, Baptist and Episcopal churches. There are graded schools and a high school, also churches and schools for negroes. Under the revised charter of 1917 the government is vested in a mayor and six councilmen. The annual receipts are about $155,000. Saint Albans is the oldest town in the Kanawha Valley, numbering Daniel Boone among its first residents. War industries in 1917–18 increased the population temporarily about 50 per cent. Pop. 3,000.

SAINT ALBANS, Confederate Raid on, a foray made 19 Oct. 1864, when Lieut. Bennett H. Young, with about 25 Confederates, nearly all of them escaped prisoners, armed with revolvers and carrying chemical preparations with which to set fire to town and farm-houses, crossed the Canada line into the town intending to burn it and rob the banks. Several citizens were killed or wounded, and three banks robbed of more than $200,000. An attempt to burn the town failed because of the defective character of the chemical preparations. Young and his party remained in town less than an hour, when they rode back to Canada on horses they had seized. Pursuit was made by United States troops, who captured some of the men on Canadian soil and turned them over to the authorities, by whom they were released on the technical ground of want of jurisdiction.

SAINT ANDREWS, ăn'drooz, Scotland, an ancient city of Fifeshire, on the North Sea, 11 miles southeast of Dundee and 31 miles northeast of Edinburgh. It was created a royal burgh by David I in 1124, and after having been an episcopal see became an archiepiscopal see in 1472; it was long the ecclesiastical capital of Scotland. The ruined cathedral was begun in 1160 and took 157 years to finish. The old castle, also in ruins, was founded about 1200 and rebuilt in the 14th century; in it James III was born, Cardinal Beaton assassinated, and in front of it George Wishart was burned. Saint Andrews was a celebrated educational centre as early as 1120; its university, the first in Scotland, dates from 1411; it consists of the united colleges of Saint Salvator and Saint Leonard and the college of Saint Mary, both at Saint Andrews, and embraces also University College, Dundee, founded in 1880. The united college of Saint Salvator and Saint Leonard has a principal (also principal of the university) and 11 professors, and the college of Saint Mary has a principal and three professors. Degrees, open to women as well as men, are conferred in arts, divinity, science, medicine and law, much as in the other Scottish universities; and the university also confers the diploma and title of L.L.A. (Lady Literate in Arts). The number of students is about 250. In connection with the university is a library containing about 100,000 printed volumes and 150 manuscripts. The university unites with that of Edinburgh in sending a member to Parliament. Madras College or Academy, founded by Dr. Bell of Madras, the principal secondary school of the place, provides accommodation for upward of 1,500 scholars. Saint Andrews is a popular watering place and summer resort and the headquarters of Scottish golf, its links being famous. The manufacture of golf clubs and balls is a thriving industry.

SAINT ANDREW'S CROSS. See CROSS.

SAINT ANGELO CASTLE, Rome, Italy, a famous fortress situated on the right bank of the Tiber in the northwestern part of the city, opposite the bridge of Saint Angelo and a short distance from the main buildings of the Vatican. It was built by the Emperor Hadrian as a tomb for himself and his family. Originally it was a round stone tower covered with marble and surmounted by a number of statues, which, together with the marble covering, have disappeared, leaving the bare stone structure. When the Goths besieged Rome it was used

as a fortress, and has served this purpose ever since, being held and garrisoned by the party in power in the city. Since the time of Innocent III it has belonged to the Popes, who strengthened the fortifications with outworks and connected the castle with the Vatican by an underground passage.

SAINT-ARNAUD, săn-tăr-nō, **Jacques Leroy de,** French soldier: b. Bordeaux, France, 20 Aug. 1796; d. at sea, 29 Sept. 1854. He entered the French army in 1813, but in 1822–31 was engaged with the Greeks in their struggle for independence. He returned to the French army in 1831, and in 1837 he went to Algeria, where he rose to the rank of maréchal-de-camp in 1847, and general of division in 1851, in recognition of his successful warfare against the Kabyle tribes. He was appointed Minister of War 26 Oct. 1851, was active in promoting the *coup d'état* of 2 December, and was made a marshal of France in that month. He was placed in command of the French forces in the Crimean War and co-operated with Lord Raglan at the battle of Alma, 20 Sept. 1854. Consult Duperrel Sainte-Marie, 'M. le Général Leroy de Saint-Arnaud' (1852).

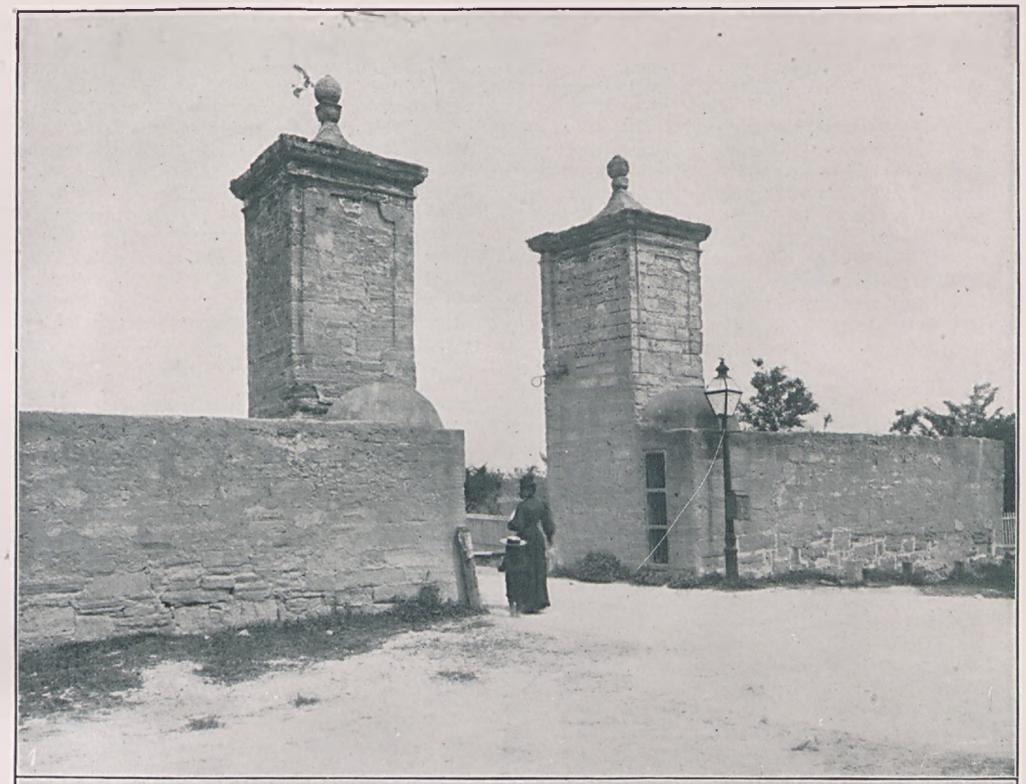
SAINT ASAPH, ăz'af, Wales, an episcopal city in the county of Flint, six miles southeast of Rhyl, occupies an eminence in the Vale of Clwyd, near the confluence of the Clwyd and Elwy. It is built irregularly and has a venerable appearance. The encampment, Bron-y-Wylva, on the brow of the hill, is supposed to have been occupied by Roman forces. The cathedral, a small plain structure, dating from 1284, has been restored several times. Its library contains some rare and valuable books. The bishop's palace is modern. The town has a grammar school, founded 1600, county offices, a union workhouse and almshouses. Pop. about 7,000.

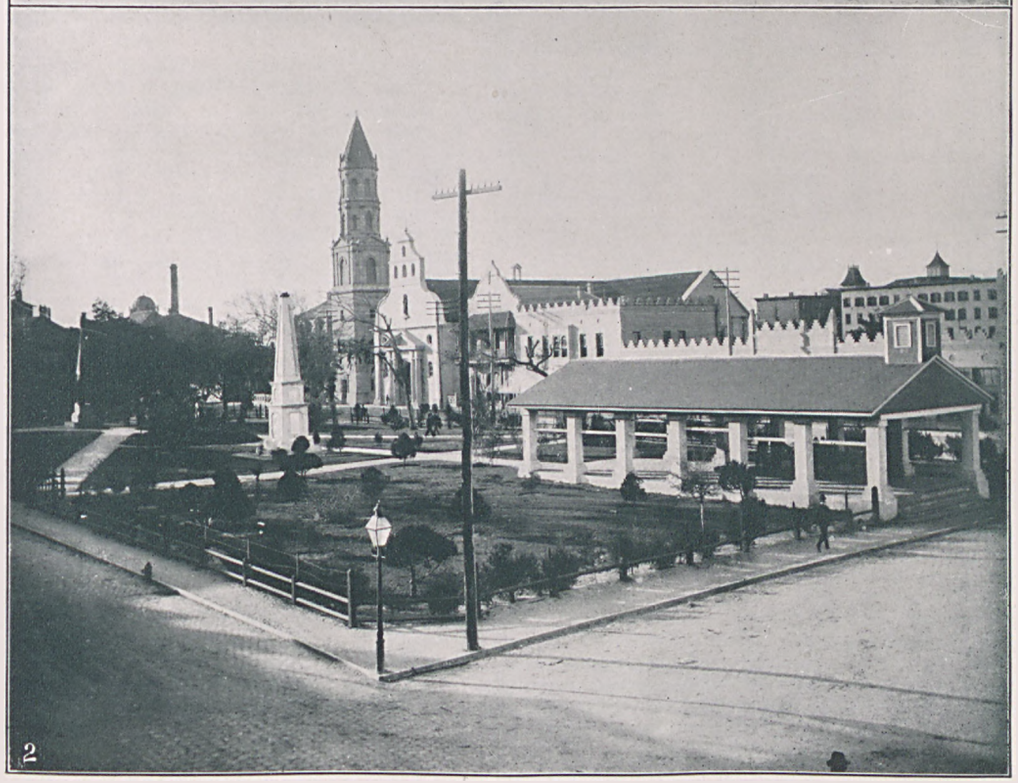
SAINT AUBAIN, săn-tō-băn, **Andreas Nicolai de,** Danish author, known largely by his pseudonym, "KARL BERNHARD": b. Copenhagen, 18 Nov. 1798; d. there, 25 Nov. 1865. He first appeared in literature as a contributor to the *Flyvende Post*, and finally obtained a large measure of success by his works of fiction, of which several dealt with higher Danish circles in modern times, while others were drawn from events of Danish history. Among the titles are 'Lykkens Yndling' ('Fortune's Favorite'); 'Krŏniker fra Christian den Andens Tid' ('Chronicles from the Time of Christian II,' 1847), and 'Krŏniker fra Erik of Pomerens Tid' ('Chronicles from the Time of Erik of Pomerania,' 1850). A collection of his writings appeared at Copenhagen in 1856–66 (2d ed., 1869–71).

SAINT AUBYN, ō'bĭn, **Alan,** pseudonym of FRANCES MARSHALL BRIDGES, English novelist: b. Surrey. She was the daughter of G. B. Bridges, a dramatist, and was married to Matthew Marshall of Saint Aubyns, Tiverton, Devonshire. Among her very numerous novels may be named 'The Master of St. Benedicts'; 'Broken Lights'; 'A Prick of Conscience'; 'The Junior Dean.' She has also written many juvenile tales such as 'Joseph and His Little Coat'; 'The Dean's Little Daughter'; 'Wapping Old Stairs.'

SAINT AUGUSTINE, â'gŭs-tēn or â-gŭs'-tēn, Fla., city, port of entry, county-seat of Saint Johns County, on the Atlantic Coast, about 38 miles south of the mouth of the Saint Johns River. The city is in lat. 29° 48′ 30″ N., and long. 81° 35′ W., on a peninsula formed by the Saint Sebastian River on the south and west and the Matanzas River on the east. It is on the Florida East Coast Railroad and the East Coast Canal. It is the oldest city in the United States, although not with a continuous existence, the latter honor belonging to Albany, N. Y. The city has many evidences of its ancient fortifications. The residence of the old Spanish governors is now a custom-house and post office. The principal streets extend north and south. The main thoroughfare, Saint George street, only 17 feet wide, extends through the centre of the city to the city gateway; but beyond this point it is called San Marco avenue. Treasury street, which crosses Saint George, is only seven feet wide at the east end. Of the modern buildings, the hotels are the most beautiful. The Ponce de Leon is of the style of the Spanish Renaissance; the buildings and furnishings cost about $3,000,000. A pictorial history of Spanish adventure in the New World, especially relating to the history of Florida, is given in the mural decorations of the dining-room and loggia.

Saint Augustine was settled 8 Sept. 1565 by Spaniards under Pedro Menendez de Aviles; but the place had been visited as early as 1512 by Ponce de Leon. For two centuries it remained under Spanish rule, although in 1586 it was plundered by Drake. The population in 1763 was 3,000, besides the garrison of 2,500. It became a British possession in 1763 which it remained until 1783. During the Revolution it was an important military depot. It became again a Spanish possession in 1783 and in 1821 it was ceded to the United States. (See FLORIDA). It was twice taken by the Federals during the Civil War. A disastrous fire in 1914 destroyed many of the city's famous landmarks. Some of the old buildings of the first Spanish régime are still in existence. The houses were then built chiefly of coquina, a formation found on Anastasia Island, a concrete made of broken shells cemented with shell-lime. The sea-wall, the city walls and the fort were made of the same material. San Marco, now Fort Marion, is a fine specimen of the knowledge of military engineering of that age. The government added a water battery in 1842–43, and has made occasional repairs, but it stands to-day about as built by the Spaniards. It is said to have been constructed by Mexican convicts and Indian prisoners, and to have been in process of erection for about 100 years. The shaft of marble in the Plaza was erected in 1812–13 to commemorate the adoption of a Spanish constitution which was more liberal than the one under which the city had been governed. The inhabitants were ordered to destroy the shaft when the project failed, but the authorities only removed the tablets which have since been restored. A Roman Catholic Church begun in 1793 and used later as a cathedral, was burned in 1887; but the façade remained almost uninjured. In rebuilding, this front wall was incorporated into the new structure; and the bell bearing the date of 1682 is also preserved. The only part of the old wall which now remains is the city gateway with about 30 feet of the wall on each side. The wall extended south along





1 The Old City Gate

2 The Plaza

San Sebastian River, and from the river to the castle of San Marco (Fort Marion) where were a wall and moat. The old city extended nearly a mile, from the Castle of San Marco to the Franciscan Convent, now Saint Francis barracks, and the old sea-wall, built to protect the city from the sea, was also limited by the castle and the convent. The government rebuilt the sea-wall in 1837–43, and there is now a granite coping three feet in width. For many years, until 1817, the entrance to the city from the mainland was by means of a drawbridge. Farming, dairying and stock-raising are extensively carried on in the vicinity.

There are a number of manufacturing industries; chief among the establishments are the Florida East Coast railroad shops, printing plant, lumber and wood works. There are engaged in oyster canning and in fishing fully 250 persons. Saint Augustine is a famous winter resort; about 25,000 persons visit the city annually. Two fine hospitals, the Alicia and the Florida East Coast, the public library, the State School for Deaf and Blind, several churches, and the municipal buildings are among the principal structures. The educational institutions are Saint Joseph's Academy, Warden Academy (colored), three public schools (white), two parish schools (white), one parish school (colored), one kindergarten and one of the 17 best libraries in the United States, entitled to all government publications free, and a museum of natural history. The one bank has a capital of $100,000; the annual amount of business is about $1,100,000. The waterworks are the property of the municipality. The city has adopted the commission plan of government. Pop. (1920) 6,192.

SAINT BARTHOLOMEW, bär-thŏl'ō-mū, or **SAINT BARTHÉLEMY,** săn bär-tăl-mē, West Indies, an island 190 miles east of Porto Rico. It is about eight square miles in area, of irregular form and mountainous. Although nearly treeless it is fertile; vegetables are cultivated in some of the valleys and bananas, cassia, tamarinds, and sassafras are exported. Rocks and shallows make access to the island difficult for any but the larger coasting craft. Lead and zinc ores have been found in the island but are not worked. The principal town is Gustavia, near the port. The island belonged to Sweden, but in 1877 was sold to the French who had previously held it from 1648 to 1784; the people, who had retained the French language and customs, desiring it. Slavery was abolished in 1848. Pop. 2,942.

SAINT BARTHOLOMEW, Massacre of. See BARTHOLOMEW, SAINT, MASSACRE OF.

SAINT BEDE COLLEGE, a Roman Catholic institution, in Peru, Ill., opened in 1891, and in charge of the Order of Saint Benedict. The faculty numbers 18 professors, and the average annual attendance of students about 200. The courses are preparatory, commercial and classical. The classical course is intended for those studying for the priesthood or for the professions.

SAINT BENEDICT'S COLLEGE, Atchison, Kan., was founded in 1858 by Benedictine Fathers. Two courses of studies are offered, the classical and the commercial; the classical course leads to the degree of bachelor of arts, while the degree of master of arts is conferred for two years' post-graduate study. The commercial course leads to the degrees of bachelor and master of accounts. A preparatory course is also provided. Two competitive scholarships are offered those who enter the classical course and there are five elective scholarships. Handsome new buildings with modern equipment grace the extensive college grounds since 1908. The average annual attendance of students is 250; the faculty numbers 26.

SAINT BERNARD, Great (Rom. *Alphis Pœnina*), Alpine Mountain pass, 8,108 feet above sea-level, 15 miles east of Mont Blanc, leading from Martigny, Switzerland, to Aosta, Italy, a distance of 53 miles, and connecting the valleys of the Rhone and the Dora Baltea. It was known to the Romans and traversed by them as early as 57 B.C., while a military road is recorded in 79 A.D. It was used also in mediæval times; and Napoleon used the pass with his army in May 1800. A carriage road now extends its full length.

The famous monastery or hospice of Saint Bernard, which stands at the summit of the pass, was founded in 962 by Saint Bernard of Menthon and is maintained for the relief of travelers lost in the snows or exhausted by the rigors of the journey. It is in charge of Augustinian monks, who, with their celebrated dogs, have saved countless lives, and who care for the bodies of the dead. There are remains of a temple of Jupiter Pœnius on the plain at the top of the pass, dating from the early days of the Roman Empire, and excavated in 1890–93.

SAINT BERNARD, Little (Rom. *Alphis Graia*), Alpine Mountain pass, 7,235 feet above sea-level, leading from Italy to France and connecting the valleys of the Isère and the Dora Baltea. It is believed to be the pass used by Hannibal and his army, 218 B.C. A monastery similar to that at Great Saint Bernard was founded here by Saint Bernard about 1000. A carriage road now traverses the pass. There are remains of a Roman road and temple.

SAINT BERNARD, Ohio, city in Hamilton County, a suburb of Cincinnati, on the Baltimore, the Ohio Southwestern, the Cleveland, Cincinnati, Chicago and Saint Louis and the Norfolk and Western railroads, and the Miami and Erie Canal. There are large manufactories of soap, fertilizers and cigars. Pop. (1920) 6,312.

SAINT BERNARD OF CLAIRVAUX. See BERNARD, SAINT,

SAINT BERNARD DOG, a race of large dogs which gets its name from the Hospice of Saint Bernard, where it has long been kept by the monks to aid them in rescuing perishing travelers. This dog is very valuable in assisting the monks to keep to the line of the road and in finding their way back. They are seldom burdened. Dogs of other races are used for the same purpose in other parts of the Alps. The Saint Bernard dog is of two varieties: the rough and the smooth coated; the first, which has long white hair with black or tawny spots are few in number. This famous dog, according to the traditions of the monastery, is the result of a cross between a Danish bull-bitch

and a mastiff, a native hill dog, though at what time effected it is impossible to say. After the breed was once established it was kept pure till 1812. About 1860 these dogs first attracted attention of English travelers, who imported them to Great Britain, where they were exhibited and at once excited much notice on account of their size and beauty. Others were introduced, and the Saint Bernard was soon established as the most popular big dog, a popularity which has gone on increasing. The Saint Bernard, as bred to modern English ideas, is an immense red or orange colored dog, marked with white on muzzle, neck, chest, feet, and tip of tail. The head should be massive and imposing, with a strong square muzzle, a point of great importance. Legs should be straight, with large feet, and double or, at least, single dew claws. Hind feet should turn out, though not sufficiently to hinder the dog's movements. The coat of the rough variety is of medium length; it should not be too curly. In the smooth variety the coat should be short and wiry. Many of the finest Saint Bernards measure over 30 inches high at the shoulder and weigh over 150 pounds. While most of these dogs are good-tempered, strangers should be cautious in dealing with them; they are very likely to attack and kill small pet dogs, especially fox-terriers.

SAINT BONIFACE, Canada, city and county-seat of Provencher County, Manitoba, at the confluence of the Red River of the North with the Assiniboine, opposite Winnipeg, and on the Canadian Pacific, the Great Northern, the Canadian Northern and Grand Trunk Pacific railroads. It is the seat of the Roman Catholic archbishop of Manitoba, and has a college, seminary, normal school, convent and two hospitals. It has meat packing and lumber industries, as well as grain elevators, brickyards, glass works, and other manufactures. Pop. (1921) 13,816.

SAINT BRENDAN'S ISLE, a legendary island supposed to have existed to the southwest of the Canary Islands and to have been discovered by the Irish monk, Saint Brendan, and 75 brother monks in the 6th century, after seven years spent in search for the land of saints. This legend is traceable as far back as the 11th century. Each of the various early geographers gives it a different location. The legend had some influence upon the discovery of America.

SAINT-BRIEUC, săn-brē'ę', France, city, capital of the department Côtes-du-Nord, 63 miles by rail northwest of Rennes. It is built on a hill rising 290 feet above the right bank of the river Gorrêt, a mile from its outlet, in its port of Le Légué, on the bay of Mont Saint Michel. A considerable coasting trade is carried on in fish, garden and farm products, and the manufacturing industries include iron, steel and agricultural implement works, lumber, brush and wool factories. The city dates from a monastery established by the Welsh missionary Saint Brieuc, in the 5th century, and has had a turbulent history, especially during the 18th century Reign of Terror. The 13th century restored cathedral, a church of the same period, the modern church of Saint Michael, the bishop's palace, the city hall with its museum and picture gallery, the military barracks, formerly an Ursuline convent, a statue of Du Guesclin, and the colossal statue of the Virgin on a dominating northern hill are among the chief features. Pop. urban, 15,300; communal, 23,000.

SAINT CATHARINES, Canada, town of Lincoln County, Ontario, on the Welland Canal, and on the Grand Trunk and Niagara, Saint Catharines and Toronto railways, 12 miles northwest of Niagara Falls, 32 miles east of Hamilton. Saint Catharines is noted for its mineral wells, has large hotels and is in a picturesque and fertile region. It has important manufactories of agricultural implements, sewing machines, foundry products, saws, edge tools, furniture, flour, saw, also planing, mills, shipyards, tanneries, woolen factories and breweries. Saint Catharines also carries on an extensive fruit trade. It has good water and sewerage systems, gas and electric lights, banks and newspapers. The more noted local institutions are Bishop Ridley College, a marine hospital and a commercial college. Pop. (1921) 19,664.

SAINT CHAMOND, săn shā-môn, France, in the department of Loire, eight miles northeast of Saint Etienne by rail, at the confluence of the Gier and Janon, is a well-built manufacturing city. There are large coal mines in the vicinity, famous dye-works and extensive metallurgical manufactures and various other industrial works, including large mills for the manufacture of silk, lace, etc. The remains of a Roman aqueduct are found at Saint Chamond. Pop. about 17,000.

SAINT CHARLES, Ill., city and county-seat of Kane County, 30 miles west of Chicago, on Fox River, and on the Chicago and Great Western and the Chicago and Northwestern railroads. It is built on both sides of the river, and has abundant water-power. It has milk condenseries, and manufactures steel ranges, chandeliers and pianos. Pop. 4,099.

SAINT CHARLES, Mo., city, county-seat of Saint Charles County, on the Missouri River, 20 miles from its mouth, and on the Wabash, the Missouri, Kansas and Texas railroads, about 14 miles northwest of Saint Louis. It was settled in 1769 by Blanchette "Chasseus," incorporated in 1795, and chartered as a city in 1849. There is an electric road connecting Saint Charles with Saint Louis. The city is in an agricultural region, in which the chief products are wheat and corn. The principal manufacturing establishments are car works and flour mills, shoe factory, oil engine works, and a stay factory. The city has large grain elevators, a foundry and machine shop. The principal public buildings are a court-house, 10 churches, 11 schools, post-office, city hall, and county jail. The educational institutions are Sacred Heart Academy, opened in 1818; Lindenwood College, the largest college for girls in the west, opened in 1830; a new high school, public and parish elementary schools, private schools and four libraries. Saint Charles has Blanchette Park which is nature's wonderful place of recreation and an excellent playground for children. The five banks have a combined capital of $320,000. The government is vested in a mayor and a council of eight members, elected biennially. Pop. (1920) 8,503.

SAINT CHARLES, Engagement at, a battle of the Civil War, fought in Arkansas County on the White River, 17 June 1862. On 10 June Capt. C. H. Davis, then in command of the Federal Mississippi flotilla, received a request from General Halleck to open up the White River for communication; he accordingly despatched a force under Commander Kilty, consisting of the ironclads *Mound City* and *Saint Louis,* and the wooden gunboats *Lexington* and *Conestoga.* Meanwhile the Confederates had fortified the bluffs at Saint Charles and, on learning of the approach of the Union vessels, had sunk their gunboat *Maurepas* across the channel and transferred her guns to the shore-battery. On 17 June a detachment of Federal troops landed below the bluffs, and the gunboats opened the attack upon the Confederate position, the *Mound City* leading; when she was within 600 yards of the shore a 42-pound shell entered her casemate and exploded her steam-drum; badly crippled she was towed out of action by the *Conestoga,* and the other boats continued the attack. The commanding officer of the land forces very shortly signaled them to stop firing, and the troops successfully stormed the Confederate battery. The Confederate loss was six killed, one wounded and eight missing; the most serious Federal loss was on the *Mound City,* the majority of her crew being killed by the escaping steam, or in consequence of jumping into the river. Of 175, only three officers and 22 men were saved. As there were no Confederate works farther up the river, this action gave control of the White River to the Federals. Consult Mahan, 'The Gulf and Inland Waters,' p. 50; 'Battles and Leaders of the Civil War' (Vol. III, pp. 552–553).

SAINT CHARLES COLLEGE, Catonsville, Md., under the auspices of the Roman Catholic Church, was founded 11 July 1831 at Ellicott City, Md. The funds for the institution were donated by Charles Carroll of Carrollton, one of the signers of the Declaration of Independence, who gave 253 acres of land from his own domain, and $5,349 in money. The charter of the school as agreed upon by Archbishop Maréchal of Baltimore and Charles Carroll, stipulated that the purpose of the school was "the education of pious young men of the Catholic persuasion for the ministry of the gospel," and that the legal administration of the college should be entrusted to five trustees, who must be citizens of the United States. The founder also requested that the trustees be members of the Society of Saint Sulpice. The school was not opened until October 1848. The faculty then consisted of the president, one assistant and four students. Under the direction of the Rev. Oliver Lawrence Jenkins during 18 years the college steadily developed, until at his death in 1869 the faculty numbered 13, the students 140 and 100 graduates were at work in the ministry. On 16 March 1911 the college was totally destroyed by fire. Plans for rebuilding were promptly set in action on a more eligible site at Catonsville generously deeded by Saint Mary's Seminary of Baltimore. Fine buildings and spacious grounds furnish all facilities. Saint Charles College forms the classical department of Saint Mary's University and Theological Seminary of Saint Sulpice, at Baltimore. The course including the preparatory work is six years. The college has power to grant degrees. Several scholarships are available in competitive examination. Recent statistics give the faculty numbers as 18, the students as 190. Of 4,461 students who have matriculated, over 1,500 have been ordained. Among its distinguished sons Saint Charles counts a cardinal, five archbishops and 13 bishops.

SAINT CHRISTOPHER, SAINT KITTS, West Indies, 45 miles northwest of Guadeloupe, is an island belonging to the Leeward group, and a British possession. Its area is 68 square miles; its length 23 miles; breadth five miles. It is traversed by a rugged range whose highest summit, Mount Misery, has an altitude of about 4,000 feet. Basse-Terre, the capital, on the coast, has a population of about 7,000. It is united administratively with Nevis, and the small island Anguila. The chief products are sugar, molasses, rum, salt, some coffee, tobacco and cattle. The island was discovered in 1493 by Columbus; colonized by the French and British simultaneously in 1625, and held by those nations alternately for some time, passing over entirely to England in 1713.

ST. CLAIR, Arthur, American soldier: b. Thurso, Caithness, Scotland, 1734; d. Greensburg, Pa., 31 Aug. 1818. He was a grandson of the Earl of Roslyn and was educated at the University of Edinburgh, after which he studied medicine. He came to America with the fleet of Admiral Boscawin and took part in the capture of Louisburg and of Quebec. In 1762 he resigned his commission of lieutenant and two years later established a home and a manufacturing industry in Ligonier Valley, Pa. He became prominent in his vicinity and held several civil offices. In 1775 he was made colonel of militia; and on 9 Aug. 1776 was appointed brigadier-general and was ordered by Washington to organize the New Jersey militia. He fought at Trenton and Princeton, and having been appointed major-general in 1777, succeeded General Gates in command at Ticonderoga. At the approach of Burgoyne, with a force more than three times outnumbering his, he evacuated the fort. A part of his force was attacked and defeated at Hubbardton. For this disaster he was tried in court-martial in 1778, but acquitted of the charges brought against him. He commanded a body of troops in 1781–82 under General Greene in the South; was a delegate to the Continental Congress in 1785–87 and its president in 1787. He was appointed first governor of the Northwest Territory in 1789, and was appointed commander-in-chief of the forces engaged in warfare with the Indians in 1791, but was defeated on 4 November, near the Miami villages. In March of the following year he resigned his commission and in 1802 President Jefferson relieved him of the governorship of the Territory. He published 'A Narrative of the Manner in which the Campaign against the Indians in the year 1791 was conducted under the command of Maj.-Gen. St. Clair,' with his observations on the statements of the Secretary of War (1812). Consult Smith, W. H., 'The Life and Public Services of Arthur St. Clair' (1882).

SAINT CLAIR, Mich., city in Saint Clair County, situated at the mouth of the Saint Clair River, and on the Michigan Central Railroad, about 43 miles northeast of Detroit and 12 miles south of Port Huron. A ferry connects the city with Courtwright on the Canadian side of the river. It is in an agricultural region and has considerable manufacturing interests. The chief industrial establishments are lumber mills, sash, door and blind factories, shipyards, salt works, brick works, iron works, foundry and tannery. The value of its taxable property is $1,708,475. There are good public, Catholic, Lutheran schools, and churches of the various denominations. The government is vested in a mayor and council There is a good system of waterworks. Pop. 3,204.

SAINT CLAIR, Pa., borough in Schuylkill County, on the Philadelphia and Reading, and the Pennsylvania railroads, five miles north of Pottsville. An electric railroad connects the borough with Pottsville. It is in an anthracite region, and the chief industries are connected with mining and shipping coal. It has large coal shipping yards, a large mining implement works, two shirt factories, and a miners' squib factory. There are a high school, public and parish schools, a private school, and a library. Pop. (1920) 6,585.

SAINT CLAIR, a lake on the boundary between Michigan and Canada, and between Lake Huron and Lake Erie. It receives the waters of Lake Huron through Saint Clair River and discharges its waters into Lake Erie through Detroit River. It is about 30 miles long, from north to south; its maximum width is 24 miles and the average width 12 miles; area, 396 square miles. It is about three feet higher than Lake Erie and five feet four inches lower than Lake Huron. The northern part is shallow, owing to the sediment from Saint Clair River; the average depth of the central part is 19 feet. The bed is covered with a blue mud, with sand and gravel in some parts, all supporting a dense growth of low vegetation in which are many forms of animal life. The lake is noted for the large number of steamers and the enormous tonnage which it carries each year.

SAINT CLAIR, a river called originally Sinclair, in honor of Patrick Sinclair, a British officer, who in 1765 purchased from the Indians a tract of land along the river. The river is the outlet of Lake Huron, and discharges its waters by several channels into Lake Saint Clair. The delta at the mouth is known as the Saint Clair Flats. A number of summer cottages and hotels have been built on the Flats. One of the channels has been improved for navigation; a canal about one and one-half miles long has been built at such an angle as to shorten the course, and of such a width and depth as to admit large lake steamers. A railroad tunnel under the river connects Port Huron in the United States with Sarnia in Canada. It is nearly two miles long, including approaches, and was opened for travel in 1891. The river is about 41 miles long.

SAINT CLOUD, săn-kloo, France, in the department of Seine-et-Oise, on a height near the Seine, seven miles west of Paris, is charmingly situated and especially interesting for its historical associations. It commands a superb view of Paris, and the beautiful shady park, with its chateau and elegant fountains, is a favorite resort of Parisians. Within the precincts of Saint Cloud are situated the new national Sèvres porcelain manufactory. The chateau was built by Gondi in 1572, purchased by the Duke of Orléans, the brother of Louis XIV in 1658, and by Louis XVI for Marie Antoinette in 1782. Henry III was murdered in the old mansion by Jacques Clement 21 Aug. 1589. Peter the Great was received there in 1717. It was the scene of Napoleon's coup of the 18th Brumaire, and his favorite residence; here he caused himself to be declared first consul, and here Blücher had his headquarters (1815). At Saint Cloud, Charles X (1830) affixed his signature to the ordinances which doomed him. Here Napoleon III signed the declaration of war against Prussia (1870).

SAINT CLOUD, Minn., city, county-seat of Stearns County, situated on the Mississippi River about 65 miles north of Minneapolis, on the Northern Pacific and Great Northern railroads. It was settled by John L. Wilson, it being located on his homestead platted by him in 1855, was incorporated in 1856, and adopted its first city charter in 1868. Saint Cloud and surrounding region lies above extensive and very valuable quarry ledges of red and gray granite that are used for monumental purposes, some building and road work. The business of shipping the finished product, monuments, etc., has increased to such an extent that the output for one year alone was $2,000,000. The city possesses one of the finest waterpowers on the Mississippi River. The developed and undeveloped waterpower amounts to 22,500 horsepower. The Public Service Company has a hydro-electric plant and owns 300 miles of high-voltage lines that supply light to 40 villages and cities, in addition to the electric power supplied to the city of Saint Cloud, State reformatory and innumerable quarries in surrounding districts. They also own a gas plant. The chief manufacturing establishments are manufactures of automobiles, trucks and tractors, also drop-forgings. The Great Northern shops are located in the city. Other manufactories are flour mills, iron works, foundries, machine shops, woolen mills, sledge factory, broom factory, woodworking factories and blank book and tablet factories; cold storage and creameries, agricultural implements, etc.

The Watab Paper and Pulp Mills, one of the largest in the Northwest, is located five miles north of the city. The large surrounding region has fine, large, fertile and productive farms; both grain and stock farms, of prize horses and cattle. Saint Cloud has the Minnesota State reformatory prison, Saint Raphael Hospital and Saint Joseph's Home for the Aged. The educational institutions are the State Normal School, largest in the State, public schools, technical high school — cost about $280,000, junior high school, three Catholic parochial schools with their high school, and a Carnegie public library. The Saint Cloud Institute — one of the finest buildings for a community centre is located here. Saint Cloud is the seat of a Roman Catholic bishop. There are 20 churches.

On 22 April 1912 the city of Saint Cloud adopted the commission form of government. Pop. (1920) 15,873.

SAINT CROIX (sometimes called Schoodic), (1) a river, the outlet of Grand Lake, flows south, east-southeast, and forms part of the boundary between Maine and New Brunswick. It empties into Passamaquoddy Bay. It is 75 miles long; navigable as far as Calais, Me., above which there is extensive water power. (2) A river which rises in Douglas County, Wis., flows southwest to the Minnesota border, then south, forming the boundary between Wisconsin and Minnesota for a distance of about 100 miles, entering Mississippi River at Prescott, Wis. It is about 150 miles long and navigable to the Falls or the Dalles, a distance of 54 miles from its mouth. At the Falls there is a descent of 50 feet in 900 feet, and below there is a cañon.

SAINT-CYR, Laurent Gouvion, lō-rōń goo-vē-ōń săń sēr, Marquis de, marshal of France: b. Toul, France, 13 April 1764; d. Hyères, France, 17 March 1830. In 1792 he entered the army and was attached to the staff of General Custine. He was rapidly promoted and in 1796 commanded the centre division in the army on the Rhine under Moreau. He was appointed to the command of the army of Italy in 1798 where he re-established discipline, the army having been on the verge of revolt against their general, Masséna. He returned to the army of Moreau in 1799, was victorious at Biberach in 1800, and in 1801 was sent to Spain to command the army which was to invade Portugal. After the treaty of peace was signed he became Ambassador to Madrid. He participated in the Prussian and Polish campaigns of 1807, and in 1808 was in command in Catalonia, where he relieved Barcelona. In 1811 he was assigned to the command of a corps in the Russian campaign. He was victorious at Polotsk in 1812 and was created marshal of France in recognition of his services. He made a brilliant fight at Dresden, but was forced to capitulate and remained a prisoner in Hungary for some time. After the Restoration he was created a peer of France, was appointed Minister of War in 1815, Minister of Marine in 1817 and a few months later Minister of War again, retiring in 1819. He wrote 'Journal des operations de l'armée de Catalogue en 1808 et 1809' (1821); 'Mémoires' (1829–31), etc. Consult De Vernon, 'Vie de Maréchal Gouvion Saint-Cyr' (1857).

SAINT CYR, or **SAINT CYR-L'ECOLE,** lā-kol, France, a village near Paris, west of Versailles, at the end of the old park of Louis XIV, celebrated for its military school. Madame de Maintenon founded here (1686) a seminary for the education of the daughters of families of high rank in reduced circumstances. The convent chapel contained the tomb of Madame de Maintenon, and Racine's 'Esther' and 'Athalie' were written for the pupils of the school and first acted there. During the Revolution this institution was abolished, and in 1806 Napoleon transferred to Saint Cyr the famous military academy which he had founded at Fontainebleau. Two advanced forts of the new enceinte around Paris are situated at Saint Cyr. Pop. about 5,000.

SAINT DENIS, săń dē-nē, France, in the department of Seine, four and one-half miles north of Paris, is an important junction on the Northern Railroad. The town is especially celebrated for its venerable abbey, from which it derives its name; the two high towers are respectively Romanesque and Gothic; the rose window dates from the 13th century. The abbey was the burial place of the kings of France and in the chapels of the nave are the tombs of Louis XII, and Anne of Brittany (1591); of Henry II; Catharine de'Medici; Louis of Orleans; Francis I; and Claude of France — one of the splendid tombs of the Renaissance; and that of Dagobert, one of the most curious of mediæval (13th century) works of art. The Crypt dates partly from the time of Charlemagne. In the centre is the vault, where the last king reposes — Louis XVIII, the only one whose ashes have been respected. The crypt also contains the Bourbon vault, where repose Louis XVI and Marie Antoinette. Modern features deserving notice are an orphanage (1886), the monument commemorative of the Revolution and other public statues, and the railway station. In 1888 the old Hotel Dieu was converted into a hospital for old men. Pop. about 72,000.

SAINT-DENIS, the capital of the French island of Réunion in the Indian Ocean, on the north coast of the island. It is built on a long, narrow beach shut off on the land side by a range of high volcanic mountains. In the city are a cathedral, a palace for the governor, a theatre, and a large number of educational institutions, including a lyceum, several large schools, a library, a museum, and a botanical garden. The harbor is an open roadstead exposed to frequent severe storms, but a new, protected harbor has been constructed at Pointe des Gallets, a few miles to the west, which is connected with the city by a railroad. Pop. about 25,000, chiefly French creoles.

SAINT DIZIER, săń dē-zē-ā (ancient Desiderii Fanum), France, department of Haute-Marne, on the Marne, 35 miles southeast of Châlons. Part of the old castle is standing and the church has some peculiar Gothic windows. There is a library and a museum. It is an important centre of the iron trade, with foundries of iron, steel, copper and bronze, engineering works, etc. It is a railway station. In 1544 Saint Dizier was besieged and taken by Charles V, although strongly fortified. In 1814 there was severe fighting nearby, between Napoleon and the Allies. The walls have been razed and the site now constitutes the promenade of the town. Pop. about 15,000.

SAINT ELIAS, Mount, in Alaska, in the southeastern part of the Territory; long. 140° 55′ 47.3″ W.; lat. 60° 17′ 35.1″ N. The United States Coast and Geodetic Survey report the height 18,100 feet above sea-level. It rises from an elevation of considerable height, and the foot-hills on the south side are covered with trees. The timber line is from 2,000 to 2,500 feet above sea-level. The mountain itself is covered with snow and ice and has many glaciers. The south side is almost perpendicular; the storms of ages and the avalanches have removed many of its rugged features. The north side is more accessible, and has been explored to some extent. The Malaspina glacier (area with subsidiary glaciers 1,500 square miles) is on the slope and at the foot of Mount Saint Elias, near Yakutat Bay.

SAINT ELMO CASTLE, Naples, Italy, a fortress crowning a rocky hill on the western outskirts of the city. It was built by Robert the Wise in 1343. It has massive walls surrounded by fosses cut out of the solid rock, and was long held to be impregnable. It is now used as a military prison.

SAINT ELMO'S FIRE. See ELMO'S FIRE, SAINT.

SAINT ETIENNE, săn tā-tē-ĕn, France, a manufacturing town in the department of the Loire, on the Furens, 32 miles southwest of Lyons. It is located amid some of the richest coal fields of France. The important buildings include the old abbey of Valbenoite, dating partly from the 13th century, a Protestant church, a synagogue, a town house, a school of mines with fine collections, and an art palace, with a museum and library, rich in old manuscripts, collections of natural history, and of ancient artillery. The enormous metallurgical establishments yield one-third of the whole French production of steel, manufactured according to the Bessemer and Martin processes. Here are also the national gun factory and other metal works. The manufacture of hemp cables, pottery and lime, the weaving of ribbon, laces, trimmings, etc., and conditioning of silk are among the varied and active industries of the town, giving employment to thousands of men and women. The collieries are very extensive, alone employing 15,000 miners, while 80,000 work in the ribbon factories, 16,000 operatives on heavy iron goods, 7,000 on hardware, and 6,000 on military and naval material, etc.

SAINT EUSTATIUS, or **STATIA,** an island in the Dutch West Indies, one of the Lesser Antilles. In 1774, the closing of the port of Boston, by order of the British government, shut off the supplies of food hitherto furnished by the colonists, caused the death of 15,000 negro slaves in the West Indies. From immediately after the battles of Lexington and Bunker Hill, this island became the chief source of supplies for the Continental Congress and armies. Fleets of American privateers, loaded with dried fish, rice, sugar, tobacco and indigo, traded their cargoes for war munitions. Here, on 17 Nov. 1776, the Dutch governor, Johannes de Graeff, after having read the Declaration of Independence, shown him by Captain Josiah Robinson, of the United States man-of-war, *Andrea Doria*, 29 guns, ordered a salute to be fired in honor of "the Congress flag" and the new nation. This was the first formal foreign salute in honor of the 13-striped American flag, on which were represented as many independent States in Union. From May 1775 until 1781, Saint Eustatius, or "Old Statia," as our fathers called it, was a mart for many nations. On 3 Feb. 1781, Admiral George Rodney, with the largest fleet ever assembled under the British flag — leaving Cornwallis in the lurch — captured the island and 24 American ships, including two men-of-war, with 2,000 sailors. Rodney auctioned off $11,000,000 worth of stores, but was plagued for years with lawsuits, since many of the traders were from Great Britain. Much of the confiscated property was British, and some of his heavily loaded prize ships on their way to England were captured by French privateers. Consult De Graeff's 'Deductie' (The Hague, p. 344, 1779); Griffis, *New England Magazine*, July 1893; Ferger, 'Alone in the Caribbean' (1918).

SAINT-EVREMOND, săn-tăvr-môn, **Charles de Marguetel de Saint Denis,** French courtier and author: b. Saint Denis-le-Guast, 1 April 1613; d. England, 20 Sept. 1703. He was educated by the Jesuits, entered the army about 1629, served in Italy under Bassompierre and later in Germany in the Thirty Years' War. He was a witty and accomplished courtier, and was for a time a favorite with Condé and also with the king; but incurred their displeasure by his sarcastic raillery and especially by his letter on the Peace of the Pyrenees. In 1662 he went to England, where he became a favorite at court and received a pension of £300 ($1,500) from Charles II. He wrote dramas, essays and letters, his collected works being published in 1705. These include 'Sir Politics,' written with Buckingham. Consult Merlet, Gustave, 'Saint Evremond, etude historique' (Paris 1870).

SAINT FRANCIS, a river which rises in eastern Missouri and flows into the Mississippi River in Arkansas, lat. 34° 45′ N. It is a large river, and was formerly navigable 300 miles for large keel boats; but the earthquakes of 1811–12 raised its channel so much, and so irregularly, as to cause the waters to overflow the banks and form a vast number of lakes and swamps. At high water the river is still navigable at some seasons of the year for about 150 miles. Its waters abound with excellent fish. Length, about 450 miles.

SAINT FRANCIS OF ASSISI. See CANTICLE OF THE SUN; FRANCIS OF ASSISI.

SAINT FRANCIS XAVIER COLLEGE, New York City. It was founded in 1847 by the Jesuits, and was granted the powers of a university in 1861 by the State board of regents. Its organization includes a collegiate and a preparatory department. The regular college course leads to the degree of A.B.; it includes instruction in logic, metaphysics, and theodicy, English and the classics, mathematics and science, and history. Post-graduate work in literature, history, sociology and psychology is provided for, and leads to the degree of A.M. There are 46 scholarships. The college is well equipped; the library contains 115,000 volumes, and the grounds and buildings were valued at over $750,000. Student attendance averages 450, a large majority being in the preparatory department; the faculty numbers 38. In 1913, the college department was removed from the island of Manhattan to Brooklyn, N. Y., where it still continues to confer degrees as the College of Saint Francis Xavier, N. Y. The high school department remains at its former location.

SAINT GALL, gâl, Switzerland, (1) capital of the canton of Saint Gall, on the Steinach, in a high, narrow valley, about 50 miles from Zürich. It is the see of a bishop, and has besides the cathedral, several churches, a monastery, now containing public offices, a large town-house, library and orphan asylum. The town library is rich in works relating to the Reformation. The ancient Benedictine Abbey was famous as an asylum of learning during the Dark Ages, and was one of the most celebrated educational institutions of Europe. Several of



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the classics, namely, Quintilian, Silicus, Italicus, and Ammianus Marcellinus, were preserved solely among its manuscripts. Notker and Ekkehard were among its pupils. Saint Gall is an important manufacturing centre, celebrated for its fine laces and embroideries. Pop. 38,683. (2) The canton covers an area of about 780 square miles. It has a diversified surface; the southern and central portions are covered by lofty Alpine ranges. Its principal lake is the Walensee but it also contains part of the Lake of Constance. The climate of the valley is mild, but in the mountainous district is rigorous. There are important stone quarries, much wood and good pastures; on the lower slopes vineyards and orchards, and some arable lands. Manufactures consist of cotton and linen goods. The constitution is pre-eminently democratic. German is the main language spoken. Pop. about 301,141.

SAINT-GAUDENS, gâ'dĕnz, **Augustus,** American sculptor: b. Dublin, Ireland, 1 March 1848; d. Cornish, N. H., 3 Aug. 1907. He was brought to the United States in infancy and at 13 was bound in apprenticeship to learn cameo-cutting and spent several years at this art. Six years later (1867) he went to Paris and studied under the sculptor Jouffroy at the Ecole des Beaux Arts. While at Rome in 1871 he produced his first figure, 'Hiawatha,' and the following year returned to the United States. Saint-Gaudens was a sculptor of originality and freshness, who had adopted the best standards of French taste and method of execution without being hidebound by tradition. He had a style at once polished and free. Among his other works are the 'President Lincoln' statue in Lincoln Park, Chicago; the bas-relief 'Adoration of the Cross by Angels'; the 'Shaw Monument' at Boston; and the 'Diana' on the tower of Madison Square Garden, New York. He also took part in executing the 'Parnell Memorial' monument in 1901, designed several medals of presentation authorized by Congress, and assisted John La Farge in decorating Trinity Church, Boston.

What perhaps is the most strikingly characteristic of all his ideal statues is 'The Puritan' (at Springfield, Mass.). It represents the puritan of earlier New England in all his aggressive and unbending strength — soldier, theologian, statesman. There is nothing winning or conciliating in his air. He is come to conquer the wilderness as Cromwell conquered the aristocracy of England and wiped out for the brief period of the commonwealth the haughtiest of European dynasties. The puritan, as Saint-Gaudens has portrayed him, carries the Bible next his heart in one hand and a stout cudgel of oak in the other. He personifies those unswerving, and sometimes fanatic principles on which the ancient commonwealths of New England were established. The Sherman equestrian statue which was unveiled at the southeast entrance of Central Park in 1904 is the last of a series of five in which he commemorated heroes of the Civil War, among the most notable of which is the remarkable statue of Farragut in Madison Square, New York. Of the Sherman monument, executed by Saint-Gaudens, a critic had said: "The composition of the Sherman is his own, and it has the spontaneity and the balance of a work evolved straight from a powerful imagination and an original mind. The Victory is exactly where it belongs, and bears a relation as true, as unforced, as anything in nature itself to the horseman pressing close upon its flying robe. Once more a word on the sculptor's discretion is inevitable. He wanted to express movement in this monument, to give to Victory almost aerial lightness in her carriage, to embody in the horse a type of great strength, pushing its way to the front, and to make Sherman himself the very ideal of a leader, who spurns the miles behind him. The bronze seems almost sentient. The group quivers with vitality. But the rhythm of this dramatic conception is held so well in hand, it is so majestic, that classic art itself could not produce a more nobly monumental effect."

SAINT GEORGE, Cape, Newfoundland, the westernmost projection of the island, forming the northwestern extremity of Saint George Bay, on the Gulf of Saint Lawrence.

SAINT GEORGE AND THE DRAGON. See DRAGON.

SAINT GEORGE'S CHANNEL, an arm of the Atlantic which separates Ireland from England. At the north it unites with the Irish Sea. Its entire length from southwest to northeast is about 100 miles. The tide rises in this channel about the same time as in the English Channel, so that there is high water simultaneously at Brest in France, Falmouth in England, and Cape Clear in Ireland.

SAINT GEORGE'S CHAPEL, Windsor, England. See WINDSOR.

SAINT-GERMAIN, săn-zhĕr-măn, COUNT OF, adventurer of the 18th century: b. perhaps 1710; d. Eckernfoerfe, Schleswig, 1784. A mystery enveloped his birth and origin, of which he took every advantage. He spoke English, German, Italian, Spanish and Portuguese to perfection, and French with a slight Piedmontese accent; and was variously thought to be the son of a tax collector at San Germano, Savoy, an Alsatian Jew, a Portuguese marquis named Betmar, or the illicit offspring of a Spanish princess. After sojourning in various cities of Italy under as many pseudonyms, he lived from 1750 to 1760 at the French court under the patronage of Marshal de Belle-Isle, and, having a fine personal appearance and address, considerable erudition and a wonderful memory, became a favorite of Mme. de Pompadour and the king. He was reported to be from 2,000 to 3,000 years old. Frederick the Great, having asked Voltaire for some particulars respecting this mysterious person, was told that he was "a man who never dies and who knows every thing." He passed the last years of his life at the court of the prince of Hesse-Cassel, and is supposed to have been employed during the greater part of his life as a spy at the courts at which he resided. Cagliostro owned himself a pupil of the Count of Saint Germain. Consult Oettinger, 'Graf Saint Germain' (1846).

SAINT GERMAIN-EN-LAYE, ŏn lā, France, a town in the department of Seine-et-Oise, on a height bordering the Seine, 11 miles west of Paris. At the edge of a forest, 200 feet above the river, the air is bracing and salubrious. It is a favorite summer resort and

residence of Parisians. The terrace of Saint Germain is one of the finest promenades in Europe and commands an extensive view of the valley of the Seine and surrounding hills. The ancient castle of the town now serves as a museum of antiquities; it was destroyed and restored at various epochs. This castle was first built by Charles V (1370), on the site of a still older structure, and reconstructed and embellished by many succeeding sovereigns, especially Louis XIV. Here were born Charles IX, Margaret of Navarre, Henry II and Louis XIV. James II of England and most of his family here lived and died as exiles. In the Henry IV pavilion Thiers died (1877). Saint Germain is the seat of one of the cavalry garrisons which surround Paris; at a short distance is the Convent des Loges, connected with the Legion of Honor (Saint Denis).

SAINT GERMAIN DE RIMOUSKI. See RIMOUSKI,

SAINT GOTTHARD, gŏth'ard, Switzerland, a mountain group on the confines of the cantons Uri, Grisons, Ticino and Valais, belonging to the Lepontine or Helvetian Alps, which it connects with the Bernese Alps. It forms a kind of central nucleus in the great watershed of Europe; each of its slopes giving rise to an important river — the north to the Reuss, the south to the Ticino, the west to the Rhône, and the east to the Rhine. All these rivers rise within a circuit of 10 miles from its centre. The culminating point has a height of 10,600 feet, and three other summits are beyond the limit of perpetual snow. The Col of Saint Gotthard, at its summit level, where the Hospice stands, is 6,808 feet high. A bridle path through the pass had existed since the 6th century and over it an excellent carriage road was completed in 1832, in which, particularly on the Italian side, formidable difficulties were surmounted, and much engineering skill displayed. A railway tunnel pierces this mountain group between Göschenen on the north and Airolo on the south, thus directly connecting the railway system of North Italy with those of Switzerland and Western and Central Germany. This tunnel is the longest in the world, being 16,295 yards, or rather more than 9¼ miles long. Its construction, begun in 1872, was completed in 1881, and it was opened for traffic early in 1882. The total cost of the railway and tunnel was about $57,800,000, of which $11,500,000 was expended on the tunnel alone, the expenses being met by Swiss, German and Italian state subventions, by mortgages and shares. The excavation was carried on simultaneously from the Italian and the Swiss side, the workmen finally meeting in the middle, where the height above sea-level is 3,785 feet.

SAINT GREGORY. See GREGORY, SAINT.

SAINT HELENA, Cal., the second town in size and importance in Napa County, 18 miles north of Napa, the county-seat, and 64 miles north of San Francisco, on the Southern Pacific Railroad. Saint Helena is part of the Carne Humana rancho, a Mexican grant that comprised all the northern part of Napa County. All lands in the rancho became the property of Dr. E. T. Bale by Mexican grant. The first men to settle the grant where Saint Helena is located were David Hudson and John York, who came thither from Missouri in 1848. The town of Saint Helena was started in 1853 by J. H. Still, an Englishman, who opened a general merchandise store on one of the numerous wood roads, the country all around being thickly wooded. Two years later Mr. Still donated building lots to others who would venture in business and a shoemaker's shop, blacksmith's shop and a few other enterprises were established. The town was named Saint Helena from the mountain of that name which stands at the head of Napa Valley. The honor of naming the town was claimed by Henry Still, William Taylor and J. W. Booker. The first school was built in 1858. The town now has fine stone buildings to house its grammar and high schools. The Ursuline Sisters conduct an academy for girls and the Seventh-Day Adventists conduct a church school, making the educational advantages unexcelled. Saint Helena also has a public library. The first church was built in 1857 and at present six denominations own their own places of worship. The town was incorporated 24 March 1876 and reincorporated 14 May 1889. The municipality has a complete sewer system. Water is furnished by a private corporation and electricity for lights and power is distributed by a company organized for that purpose. Saint Helena has several stone bridges and over eight miles of cement sidewalks. Its main street is paved. There are three banks the combined resources of which total $2,000,000. There are two newspapers, the *Star* and the *Photogram*. The principal industries are viticulture and horticulture, poultry-raising and general farming. Business enterprises are well represented and there are several fraternal orders. Pop. (1920) 1,346.

SAINT HELENA, hĕ-lē'na, an island in the Atlantic, belonging to Great Britain, 700 miles southeast of the island of Ascension, the nearest land. The area is about 47 square miles. Although remote from the mainland, it is in the direct line of ocean communication via the Cape of Good Hope, many vessels making it a stopping point. It is of volcanic origin, the crater of the volcano forming the main ridge of the island. Many gorges, some of which are 1,000 feet deep, converge from the walls of the crater in all directions and numerous caves have been formed. High cliffs extend all along its shores to the water's edge, and there is a good harbor. The fauna and flora are interesting, many specimens being peculiar to the island. Farm and garden produce constitutes the entire wealth of the colony. Jamestown (3,000 inhabitants) is the only town. Longwood, where Napoleon died, is a farm-house, standing on a high plain. The Portuguese discovered the island, subsequently the Dutch took possession, and later it was ceded to Great Britain. Its chief interest is in its having been the place of Napoleon's captivity.

SAINT HELENS, England, Lancashire, 11 miles northeast of Liverpool, a municipal county and parliamentary borough, and market town. A total hall (1875–76), a technical institute (1896), churches, schools, library and baths, an asylum and hospitals, numerous parks and recreation grounds are the main features. The town owes its importance to the coal-beds in the environs, copper-smelting, the manufacture

of iron and steel, chemical and lead works, potteries, breweries, its glass works and other industries. Pop. about 97,000.

SAINT HELENS, a volcanic peak of the Cascade Range, in the State of Washington; lat. 46° 12′ N., long. 122° 4′ W., height, 9,750 feet. The volcanic débris at the base and beyond is of ancient origin; the mountain has all the appearance of an extinct volcano. It resembles Mount Rainier in its treeless sides and ice-covered summit, but it is smaller. On the north side, at the base, is Spirit Lake.

SAINT HELIER, hĕl-yĕr, Channel Islands, capital of the island of Jersey, and a favorite European summer resort, on the east side of Saint Aubin's Bay, on the south coast. It is strongly fortified and defended by Elizabeth Castle (1551–86), on a rocky island connected with the mainland by a causeway, and by Fort Regent, an imposing citadel dominating the town. The principal buildings are Victoria College, the Maison Saint Louis or Jesuit College, the court-house, public library, town hall, hospital, Norman parish church and the French Roman Catholic cathedral. Fine markets, an esplanade and marine drive four miles long encircling the bay, and extensive and well-built harbors, are prominent features. There is considerable trade with England, France and India, in fruit, potatoes and cattle. Pop. about 30,000.

SAINT HENRI, or **TANNERY WEST,** Canada, an incorporated city of Hochelaga County, Quebec, suburban to Montreal on the southwest. It is a busy industrial centre on the Lachine Canal, and has a station on the Grand Trunk Railway. Cotton, leather, confectionery, sewing machines and machinery are among its principal manufactures.

SAINT-HILAIRE, săn-tē-lăr, **Augustin François César,** called **Auguste Prouvençal de,** French naturalist and traveler: b. Orléans, 4 Oct. 1779; d. there, 30 Sept. 1853. A botanical expert, he set out in 1816 on a long journey through Brazil, carrying his explorations to regions then unknown, and returning in 1822 with valuable collections. In 1830 he was admitted to the Paris Academy of Sciences; subsequently he was made professor of botany in the Faculty of Sciences at Paris. He made several discoveries of scientific value, and published three narratives of travel, 'Voyage dans les provinces de Rio de Janeiro et Minas Gerães' (1830); 'Voyage dans le district des diamants et sur le littoral du Brésil' (1833); 'Voyage aux sources de San Francisco et dans la province de Goyaz' (1847–48); besides 'Flora Brasiliæ Meridionalis' (with Jussieu and Cambessèdes 1825), and 'Leçons de Botanique' (1840–41).

SAINT-HILAIRE, Marco de, pseudonym of EMILE MARC HILAIRE, French writer: b. Versailles, about 1796; d. 5 Dec. 1887. He was educated as a page at the court of Napoleon I, and finding himself without means of support after the Restoration, turned his attention to literature. Though not important as a writer, his constant glorification of Napoleon was popular and undoubtedly did much to pave the way for the Second Empire. His work includes 'Mémoires d'un page de la cour impériale' (1830); 'Souvenirs de la vie privée de Napoléon' (1838); 'Souvenirs intimes du temps de l'Empire' (6 vols., 1838–46); 'Histoire de Napoleon III' (1853), etc.

SAINT HUBERT, Order of, a Bavarian order founded by Gerhardt V in 1444, and originally named the Order of the Horn, so called from the hunting horns of which the links of chain were made. The membership was composed of the nobility, the number being unrestricted, while those of lower rank were limited to 12. A white cross with eight points, on each of which is a small golden ball, constitutes the decoration of the order. A crown surmounts the cross, while the arms of the cross are divided by three rays of gold representing Light from Heaven. On the medallion is pictured Saint Hubert's conversion, under which, on a red ribbon, is the inscription «In trav vast» (Firm in Faith).

SAINT HYACINTHE, hī'ā-sĭnth (Fr. Săńt ē-ā-săńt), Canada, city and port of entry, county-seat of Saint Hyacinthe County, Quebec, on the Yamaska and Black Rivers, and on the Grand Trunk, Canadian Pacific, Intercolonial and Quebec Southern railways; 35 miles northeast of Montreal. It is the seat of a Roman Catholic bishop, and among its more notable institutions are Saint Hyacinthe College (Jesuit), occupying a handsome stone building, a nunnery with a seminary for young ladies, a hospital in charge of the Sisters of Charity, and monasteries of the Precious Blood and Dominican Fathers. The principal manufactures of the city are woolen goods, lace, linens, hosiery, corsets, boots and shoes, leather, flour, lumber, woodenware, organs, agricultural implements, castings and machinery. Pop. (1921) 10,852.

SAINT IGNATIUS COLLEGE, a Roman Catholic institution located at Chicago, Ill. It was chartered in 1870, and is under the control of the Jesuits. It has a collegiate or classical, and an academic department; religious instruction is a part of all courses. In the collegiate department the degrees of A.B., B.S. and Ph.B. are conferred; and the degree A.M. for graduate work. Though the college is designed especially for Roman Catholic students, non-Catholics are admitted. The library contains over 50,000 volumes, including a select library for the special use of undergraduates; there are also a good scientific laboratory equipment and valuable mineralogical and zoological museums. There are no dormitories. The college has no endowment, and is dependent mainly upon its tuition fees for income. In 1907 Saint Ignatius College opened a department in law and was reincorporated under the name of Loyola University. Loyola University conducts departments in law, in engineering (two years), medicine (The Chicago College of Medicine and Surgery, 706 Lincoln street); sociology (Ashland Block) and two academies — Saint Ignatius Academy and Loyola Academy (Rogers Park). The attendance in all departments is 1,850.

SAINT IVES, īvz, England, seaport and watering resort, in Cornwall on Saint Ives Bay, 57 miles southwest of Plymouth. The parish church of Saint Andrew is in the Early Perpendicular style of the 15th century. The town-hall, a free library and a new pier are, with the harbor, the chief features of interest. Pop. about 7,000.

SAINT JACOB, or SANKT JAKOB, sänkt yä'kŏp, Switzerland, a small village on the Birs in the canton of Basel, two miles southeast of Basel. It is noted for the important battle fought there on 26 Aug. 1444, between the Swiss Confederates and the Armagnacs, in which the latter were totally defeated.

SAINT JAMES' COFFEE-HOUSE, a famous Whig coffee-house of London which flourished from the time of Queen Anne until late in the reign of George III. It stood on Saint James' street in the neighborhood of Saint James' Palace, and was much frequented by Swift, Harley and other men of note in its early days. It was here that Goldsmith's poem 'Retaliation' originated. The poet, one of a group of men of talent who met here, was proverbially late in his arrivals. On one such occasion those present wrote in jest epitaphs "on the late Dr. Goldsmith." None is preserved save Garrick's which became famous:

> Here lies poet Goldsmith, for shortness called Noll;
> He wrote like an angel, but talked like poor Poll.

The retort above mentioned dealt in a satirical vein with the club members who had exercised their wit upon him.

SAINT JAMES' PALACE, England, a royal palace in London, between Saint James and Green parks. It was built originally for a hospital, reconstructed by Henry VIII, enlarged by Charles I. Henry VIII annexed to the palace a park enclosed by a brick wall, connecting it with Whitehall. Queen Mary died here in 1558; Charles I spent his last night in this palace; and here were born Charles II, the Old Pretender, and George IV. After Whitehall burned down in 1697, Saint James became the London residence of the sovereigns up to the time of Queen Victoria. It is still known as the Court of Saint James and is used for levees and drawing rooms. In 1837 Buckingham Palace became the royal home. The park covers 58 acres.

SAINT JEAN D'ACRE, săn zhŏn dăkr, Palestine. See ACRE.

SAINT JEROME DE MATANE, or MATANE. See MATANE.

SAINT JOHN, one of the 12 apostles of Jesus Christ. He and his brother James are often spoken of as sons of Zebedee. It is commonly accepted (cf. Mark xv, 40 and Matt. xxvii, 56) that his mother's name was Salome and it is still further conjectured by many (see John xix, 25) that she was a sister of Mary, the mother of Jesus — a relation which would render more natural the committing by Jesus of his mother to the care of John. The family seems to have possessed some means, as Zebedee employed hired servants in his fishing business; Salome is mentioned among the pious women who aided in the support of Jesus and his associates during his ministry and John himself was personally known to the high priest.

Of his early life we know nothing. Presumably he had the ordinary training of the Jewish boy of his time and no more. In the order of narration, he first appears, according to an obvious inference, as an unnamed disciple of John the Baptist, who with Andrew follows Jesus (John i, 35–39). After some association with Jesus, John returned to his occupation as a fisherman, from which Jesus summoned him and his brother, together with Simon and Andrew, to discipleship, which was the basis of his appointment as one of the 12 apostles. In this company he was one of the three who were admitted to the closest intimacy with their Master and, indeed, is generally understood to be "the disciple whom Jesus loved." Little in particular is noted, however, in reference to him while Jesus lived. He and his brother are said to have been called "Boanerges," defined as "Sons of Thunder" (Mark iii, 17). While the meaning is somewhat obscure, it seems most probable that this hints at great stores of emotional power and passion. He, with his brother, is rebuked for proposing to summon fire from heaven to destroy the inhospitable Samaritan village, and he alone confesses attempting to check the activity of a healer who was not of their company. Only he of the apostolic company is mentioned as present at the trial of his Master and at his crucifixion, where he received the commission to care for Mary, the mother of Jesus, which he faithfully carried out, making a home for her till her death.

It appears from the statements in Acts and of Paul in his Epistle to the Galatians that for some time John remained in Jerusalem. Beyond this we are dependent upon tradition, which consistently associated the latest years of his life with the city of Ephesus. To be sure, on the basis of uncertain inferences from an obscure passage possibly incorrectly quoted by Eusebius from Papias, it has been argued by many scholars that all the tradition that John was at Ephesus was due to the confusion of the apostle with a supposed presbyter and original disciple of Jesus bearing the same name. But all the positive evidence tends toward the association of John in his latest years with Ephesus. There is a fragmentary tradition that he went to Rome and was there plunged into a cauldron of boiling oil, from which he miraculously escaped unharmed, and that he was then banished to an island. John, the author of the Apocalypse, speaks of himself as being "in the isle that is called Patmos," and the date which is given by Irenæus and others for the exile of John the apostle is late in the reign of Domitian, and for his return the year 96, early in the reign of Nerva. There is no tradition as to the date of his death. Many legends are current as to his life at Ephesus. Irenæus tells of his hostility to the tenets of the Gnostic Cerinthus, such that John even refused to remain under the same roof with the heretic. Clement of Alexandria exalts his pastoral fidelity by a story how he journeyed into the forest to reclaim a young man who had fallen into evil ways and joined a band of robbers. Cassian relates that when he was censured for spending time in play with a tame partridge, he answered that the bow cannot always be bent. The story, however, which is most familiar, is due to Jerome, who tells that, when so aged that he must be carried into church and was unable to speak at any length John would continually repeat, "Little children, love one another." Perhaps partly based on this story, partly perhaps on an impression gained from a superficial reading of his letters, the notion has widely prevailed that John was a weak sentimentalist. But this is unjust. It has been profoundly said of his epistles that their words are thunderpeals and it is plain that in his soul burned the fires of passion and power which made him in his youth one of the "Sons of Thunder," although in his age he had learned repression and self-mastery.

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ST. JOHN, Charles Edward, American physicist: b. Allen, Mich., 15 March 1857. He was graduated at the Michigan Normal College in 1876 and studied physics at Harvard and at the University of Berlin. He became instructor of physics at Michigan Normal College in 1885; was made associate professor at Oberlin College in 1897 and in 1899 became professor of physics and astronomy at that institution. In 1907 he was appointed dean of the College of Arts and Sciences there. From 1908 he has been astronomer at the Mount Wilson Solar Observatory of Carnegie Institution. He is a member of various national astronomical societies. He has written 'Wave-Lengths of Electricity on Iron Wires' (1894); 'A Study of Silphium Perfoliatum and Dipsacus Laciniatus in Regard to Insects' (1887).

ST. JOHN, Frederick Edward Molyneux, Canadian journalist and author: b. Newcastle, England, 28 Nov. 1838. His father was one of Wellington's veterans at the battle of Waterloo and the son followed him in a military career, on 23 April 1855 entering the Royal Marines (Light Infantry) as second lieutenant. He served under General Van Straubenzie throughout the operations against Canton in 1857–58 and acted with such gallantry under fire during the storming of the fort that in August 1858 he was promoted first lieutenant. In 1868 he came to Canada and being a member of the staff of the Toronto *Globe* was appointed in 1870 to accompany Colonel Wolseley's Red River expedition and later served with Lord Dufferin on his tour of British Columbia. Upon the forming of the Northwest Territories, he became the first clerk of the legislature, the first secretary of the Protestant board of education and later was appointed sheriff and Indian commissioner. In 1879 he returned to England, where in 1884 he became the first emigration agent and London secretary to the Canadian Pacific Railway. He was at different times editor of the Winnipeg *Standard*, the Montreal *Herald* and the Manitoba *Free Press* and in 1888 was president of the Ottawa Press Gallery. He has published 'A Sea of Mountains,' an account of Lord Dufferin's tour (1877); and 'Under the Mistletoe,' a society play.

ST. JOHN, Henry. See BOLINGBROKE, VISCOUNT.

ST. JOHN, James Augustus, English author and traveler: b. Carmarthenshire, Wales, 24 Sept. 1801; d. London, 22 Sept. 1875. At 16 he went to London and engaged in newspaper work and in 1827 started the *Weekly Review*. He lived much of his life abroad, in France, Switzerland, Egypt and elsewhere and found material in his travels for many of his works. He contributed to 'Constable's Miscellany' in 1830 a 'Journal of a Residence in Normandy' and wrote 'Egypt and Mohammed Ali' (1834); 'Anatomy of Society' (1831); 'Manners and Customs of Ancient Greece' (1842); 'Egypt and Nubia' (1845); 'Views in the Eastern Archipelago' (1847); 'Isis, an Egyptian Pilgrimage' (1853); 'Philosophy at the Foot of the Cross' (1854); 'Nemesis of Power' (1854); 'Preaching of Christ' (1856). He also wrote 'Lives of Celebrated Travelers' (1831); a biography of 'Louis Napoleon' (1857); an elaborate 'Life of Sir Walter Raleigh' (1868–69), etc.

ST. JOHN, John Pierce, American governor and prohibitionist: b. Brookville, Ind., 25 Feb. 1833; d. Olathe, Kan., 31 Aug. 1916. He went to California in 1853; later traveled in Mexico, Central and South America and Hawaii; and fought in Indian wars in Oregon. He served in the Union Army in 1862–65, attaining rank of lieutenant-colonel and subsequently removed to Missouri, where he engaged in law practice. In 1869 he settled at Olathe, Kan., and in 1879–83 he was governor of Kansas. He was Prohibition candidate for President in 1884, but in the first Bryan campaign affiliated himself with the Democratic party. He toured Kansas for woman suffrage in 1912 and in 1914 went on a speech-making tour of the East in behalf of prohibition.

ST. JOHN, Sir Spencer, English diplomat, son of J. A. St. John (q.v.): b. London, 22 Dec. 1825; d. Camberley, Surrey, 2 Jan. 1910. In 1848 he was appointed secretary to Sir James Brooke in Borneo, in 1850 became secretary to the mission to Siam and during 1856–61 was consul-general in Borneo. During the years 1863–96 he was consul successsively in Haiti, Lima, Bolivia, Mexico and Stockholm. He was created K. C. M. G. in 1881. He has published 'Life in the Forests of the Far East' (1862); 'Life of Sir James Brooke, Rajah of Sarawak' (1878); 'Haiti, or the Black Republic' (1885); 'Rajah Brooke, (1899); 'Adventures of a Naval Officer' (1905); 'Earlier Adventures' (1906); 'Essays on Shakespeare and his Works' (1908).

SAINT JOHN, one of the Virgin Islands, formerly Danish West Indies, lying east of Saint Thomas (q.v.), area, 21 square miles. It is of volcanic origin and hilly; only a small portion of the land is cultivated; sugar is the chief agricultural product. Cattle are raised and exported and bay rum is also exported. Coral Bay, on the east coast, is one of the best sheltered and safest harbors of refuge during hurricanes in the Antilles. By the terms of a treaty with the United States, ratified by the Danish parliament 22 Dec. 1916, the entire Danish West Indies, for and in consideration of the sum of $10,000,000, passed into the possession of the United States and are now administered by it. Pop. 925. See WEST INDIES, DANISH.

SAINT JOHN, British West Indies, the capital of Antigua, situated on the northwest coast, stands at the head of a safe but small bay. The residence of the English governor-

in-chief is the principal building. The staple of the island is sugar, which, together with pine-apples, forms the chief export trade.

SAINT JOHN, Canada, city and county-seat of Saint John County, New Brunswick, situated at the mouth of the Saint John River on the shores of the Bay of Fundy; on Canadian Government, Canadian Pacific and New Brunswick Southern railroads, 450 miles from Boston, 480 from Montreal and 275 from Halifax. It is the Atlantic terminus of the Canadian Pacific Railway.

Shipping Interests.— The harbor of Saint John has ample accommodations for ships of large tonnage. It has always been the principal port in New Brunswick for the shipment of lumber, for it commands the trade of the Saint John River and its tributaries, which flow through one of the great forest regions of the continent. The port is becoming the great winter port of Canada and there are now three grain elevators, and connected with them berths for seven large steamships which can all load or discharge at the same time. Other wharves are being built for the growing trade of the port, the exports of which amounted in 1916–17 to $190,586,561. The development of the West is making Saint John a very important shipping port and the outlet for a large proportion of the products of the great prairie region beyond Lake Superior. During the year the sea-going vessels entering and cleared at Saint John numbered 2,161, totaling 2,336,-614 tons. Lines of steamships run from Saint John to Great Britain during the winter and there are regular sailings to the West Indies.

Saint John has steamboat connection with Portland, Me., Boston, Digby, Yarmouth, Grand Manan and other points on the sea coast, and with Fredericton and other points on the river.

Business Interests.—Saint John has become a considerable manufacturing centre, and has cotton mills, iron and brass foundries, elevators, saw and pulp mills, nail factories, rolling mills, a broom and brush factory, flour mills, sugar refining plant and many other industries. Saint John is the only city in Canada which owns its own harbor.

Public Works, Buildings, etc.— Saint John has an electric railway system, electric lighting and a splendid water and sewerage system. It has a large public hospital, fine modern school-houses, exhibition buildings, free public library, and other public buildings of a similar character. Its custom-house is said to be one of the finest in the world. The city has about 44 churches.

History, Population, etc.— The Saint John River received its name from Champlain, who visited it in the year 1604, and it was at that time the site of an Indian town. The French held possession of the country until the year 1713, when Acadia was ceded to Great Britain under the Treaty of Utrecht. A fort was built in 1630 by Charles La Tour on the west side of the harbor, which was afterward from time to time occupied by garrisons until the year 1700, when it was allowed to fall into ruin for about half a century. About the year 1758, however, it was taken possession of by the English, rebuilt and named Fort Frederick. The first English settlement at Saint John was in 1762, when Messrs. Simonds, Hazen and White began business at what is now called Portland Point, engaging in the fisheries and in the manufacture of lime. In 1783, Saint John received a large accession to its population by the coming of the Loyalists, who had left the old Thirteen Colonies after the establishment of their independence. Saint John received a charter and became a city in 1785; it was the first city in Canada to adopt the commission form of government. Pop. (1921) 46,504.

JAMES HANNAY,
Author of 'New Brunswick: Its Resources and Advantages.'

SAINT JOHN, Knights Hospitallers of. See JOHN, ORDER OF SAINT.

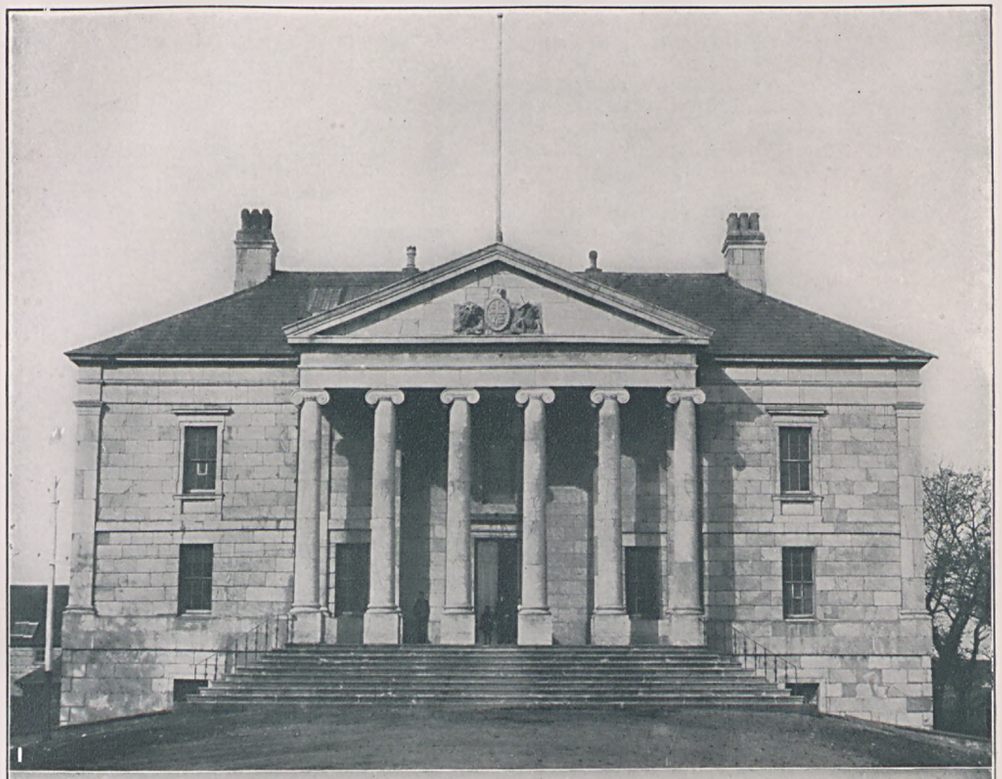
SAINT JOHN, Lake, Canada, in the Chicoutimi district, Quebec, 200 miles by rail north of Quebec, a circular body of water, about 28 miles long and 25 miles broad, drained by the Saguenay River (q.v.). It receives the waters of the Metabetchouan, the Mistassini, the Peribonca, the Ashuapmouchouan, the Ouiatchouan and several smaller streams.

SAINT JOHN RIVER, Canada, the largest river of the province of New Brunswick, has its source in the highlands of northern Maine. After a course of 390 miles, it empties into the Bay of Fundy through a rocky gorge about 600 feet wide, having a total fall of about 17 feet. Throughout most of its upper course it forms the boundary between Maine and Canada. It is navigable for steamers of considerable size as far as Fredericton, a distance of 84 miles, while small steamers ascend to Woodstock, 145 miles.

SAINT JOHNS, Mich., village, county-seat of Clinton County, on the Detroit, Grand Haven and Milwaukee Railroad, about 20 miles north of Lansing and 100 miles west-northwest of Detroit. It is in an agricultural region and it has considerable manufacturing interests. The chief manufactories are a large table factory, grist mills, lumber mills, carriage works, machine shop and foundry. There is considerable trade in manufactures and farm products. The educational institutions are a high school, public graded school and a library, which is under the auspices of the Ladies' Library Association. Pop. 3,925.

SAINT JOHN'S, Newfoundland, the capital of the colony, situated on the east side of the island, on the Atlantic Coast, midway between Cape Race and Cape Bonavista, in lat. 47° 33′ 54″ N., and long. 52° 40′ 18″ W. It is distant 1,691 miles from Cape Clear (Ireland), 1,213 from New York, 885 from Boston, and 488 from Halifax, Nova Scotia. The harbor is completely land-locked, with good holding ground, and is entered by a short passage, known as the "Narrows," between high beetling cliffs. The town is situated on the north side of the harbor.

Communication.— Saint John's is the terminus of the Newfoundland Railway, which runs across the island to Port Aux Basques. Steamship lines connect with New York, Philadelphia, Montreal and Sydney, Cape Breton, and in normal times with Liverpool and Glasgow. Constant communication is maintained with all parts of Newfoundland and Labrador by the fine steamers of the Bowring and Reid Lines.





1 Parliament House

2 The Governor's Residence

Each bay has also a local steamer running in connection with the railway.

Shipping Interests.— Saint John's is not only the capital of the colony but the centre of all the business and financial interests of the island and Labrador. Three Canadian banks, Bank of Montreal, Bank of Nova Scotia and Royal Bank, have their headquarters in the city. All the principal merchants reside here, all the supplies for the chief business, the fishery, are bought in Saint John's, and the great bulk of the exports shipped from the capital, 90 per cent of the duties being paid and the revenue collected in Saint John's.

At the head of Saint John's Harbor there is a splendid dry dock, built by the government, but now leased to the Reid Newfoundland Company. It is capable of taking up the largest ships. There is ample warehouse room and the Reid repairing shops are equipped with all the best modern machinery.

Manufactures.— There are several important factories, one of the largest being a ropewalk, also biscuit factories, oleomargarine factories, tanneries, breweries, lumber factories, foundries, a large tobacco factory and an extensive boot and shoe factory, with several minor establishments. The most extensive business is connected with the curing and drying of codfish for foreign markets, the exports of this fish in 1916–17 being valued at nearly $13,000,000. Seal, cod and whale oil are manufactured and guano from the whale refuse. Between 300,000 and 400,000 skins of the hair seal are in normal times sold to be manufactured into leather and fur abroad.

Public Works, Buildings, Etc.— The capital of Newfoundland has an electric railway, electric light and owing to recent improvements one of the finest water services of any town in America. There are very complete telephone and telegraph lines, one belonging to the Anglo-American Telegraph Company, the other to the local government. The town possesses a large public hospital, convalescent home, lunatic asylum, poorhouse, a large Roman Catholic cathedral, and an Anglican cathedral, one of the most beautiful of churches, a masterpiece of the late Gilbert Scott, which has lately been restored after being destroyed by fire in 1892. The customs-house and courthouse are commodious but not picturesque. Government house has fine grounds, but the building is very plain. There are also fine schools and churches.

Education.— Education is strictly denominational, even the Salvation Army having separate schools. The Anglican, Roman Catholic and Wesleyan bodies have very fine colleges and good schools, but no university.

History.— Owing to its unrivaled position in the centre of the great cod-fishing grounds Saint John's became, from the date of the discovery of North America in 1497, the centre and metropolis of this great industry. The date of its foundation cannot be exactly determined. Its first inhabitants were part of the fishing ships' crews left behind to build boats, houses, stages, etc., for the fishery. There were 20 houses in Saint John's in 1540. In 1583, Hayes, the survivor of Gilbert's ill-fated expedition, speaks of the town as a «place very populous and much frequented.» A large barter trade was carried on between the French, Portuguese, Spanish Basques and the English fishermen, the principal traffic consisting in selling for cash, or bartering for fish and oil. Mediterranean products, salt, olive oil, fruits, wines, etc., were exchanged for the then as now famous West of England cloth, cordage, cloth caps and hosiery and the well-known Sheffield cutlery. There were 20,000 men engaged in this early transatlantic fishery, and the trade was one of the most important of the Tudor Age. The American colonists began trading with Newfoundland as early as 1641. By the time of the Revolution, Saint John's did a business of $4,000,000 with the United States, mainly through Boston and New England.

The town was twice captured by the French and destroyed by them and their Indian allies. It was recaptured in 1762, by Colonel William Amherst, with the Highlanders and Royal Americans, the last and most gallant fight of the great Seven Years' War. Saint John's was built entirely of wood and has been several times utterly destroyed by fire, once in 1817, again in 1846 and partially in 1892. It has been greatly improved of late years and is now built chiefly of stone and brick, and is a well-laid-out city.

Government and Population.— Saint John's is governed by an elected mayor and an elected municipal council of six members. The population numbers about 32,292; nearly one-half are Roman Catholics.

D. W. Prowse,
Author of 'The History of Newfoundland, from the Records.'

SAINT JOHNS, Quebec, a town, the county-seat of Saint Johns County, situated on the Richelieu River, 27 miles southeast of Montreal. It is a port of entry and a station on the Grand Trunk, Canadian Pacific and Central Vermont railroads. It has a high school, college, convent and hospital and military school. The principal manufactures are earthenware and linen and silk goods. Large quantities of lumber and agricultural products from the lower Champlain region are exported through Saint Johns. Saint Johns is connected with Iberville by a steel bridge; the combined population is 12,000.

SAINT JOHNS, a river in Florida; the source, Lake Poinsett in Orange County, is about 12 miles from the Atlantic Ocean. The river flows north, nearly parallel with the coast, and enters the Atlantic about 15 miles northeast of Jacksonville. The total length is about 350 miles. It flows through swamps, ponds and lakes; luxuriant vegetation is along its banks the greater part of the course. In some places are large trees, their green foliage intermingled with feathery brown and gray mosses which hang down to the ground. Reptiles are numerous in the marshes. In the north part of its course the land is higher and dryer. It is navigable to Enterprise in Volusia County. See Florida.

SAINT JOHN'S BREAD. See Carob.

SAINT JOHN'S COLLEGE, Cambridge, England, was founded by Margaret, countess of Richmond and Derby, mother of King Henry VII, in 1511 mainly through the exertions of Fisher, bishop of Rochester, then chancellor of the university, who raised sufficient funds to endow 32 fellowships. The college replaced Saint John's Hospital founded in

the 12th century, and now consists of a master, at least 56 fellows, 60 foundation scholars and nine sizars; both fellowships and scholarships being open to all British subjects. Five fellowships are professorial fellowships to be held by professors of the university. There are three divinity studentships of the value of about $400, tenable for three years, and open to the competition of bachelors of arts not of sufficient standing to take the degree of M.A.; also four law studentships of the value of $450, tenable for four years; and a Hebrew scholarship of the value of $160, tenable for three years. Some $33,500 are expended annually in assisting deserving students of the college, and there are a number of prizes which are awarded on the results of the annual examinations. The college has the patronage of 52 church livings. The buildings include four courts chiefly of brick; the new court (1826) across the Cam, built of stone, is united by an ornamental covered bridge, commonly called the "bridge of sighs," with the third court. The chapel (1869) is by Sir Gilbert Scott, and is a fine specimen of the Early Decorated style. The combination-room, 93 feet long, and the library (1623) are curious and striking. Ascham, Ben Jonson, Bentley, Rowland Hill, Wilberforce, Wordsworth and Lord Palmerston were members of the college.

SAINT JOHN'S COLLEGE, Oxford, England, a college founded in 1555 by Sir Thomas White, a London alderman, for a president, 50 fellows and scholars, a chaplain, an organist, six singing men, eight choristers and two sextons. Some of the buildings belong to the earlier college or Saint Bernard dating from about the middle of the 15th century. With buildings added at subsequent dates the whole forms a picturesque group. Under the present statutes the college consists of: (1) Not less than 14 nor more than 18 fellowships, of which seven may be official fellowships, the rest tenable for seven years. To these may at future times be added two ex-officio fellowships to be held by the Laudian professor of Arabic and the professor of civil engineering. (2) Not less than 28 scholarships, of which six shall be open, 15 appropriated to Merchant Tailors' School, two to Coventry School, two to Bristol School, two to Reading School and one to Tunbridge School. (3) Four senior scholarships confined to former pupils of Merchant Tailors' School. There are also the Holmes Scholarship, tenable for five years: the Lambe Scholarship, tenable for four years; the four Casberd scholarships of $400 each per annum, and certain exhibitions for undergraduates not on any foundation, and of at least one year's standing in the college. There are also four fellowships, tenable for 14 years, open with certain limitations and under certain conditions in respect of literary proficiency, first to the kindred of the founder, Dudley Fereday of Ettingshall Park, Stafford, secondly to natives of Staffordshire, and then to any other person whatsoever. Thirty-three church livings are in the patronage of the college.

SAINT JOHN'S COLLEGE, located at Annapolis, Md. It was chartered in 1784 and opened to students in 1789, but is the direct successor of King William's School (founded 1696), which in 1784 was merged into the college, thus being one of the oldest institutions of collegiate grade in the United States. The work of the collegiate department is arranged in four courses, classical, Latin-scientific, scientific and mechanical engineering; in each course certain studies are required and others are elective. The degree of A.B. is conferred for the completion of the classical and Latin-scientific courses; the degree of B.S. for the scientific and mechanical engineering courses. Graduate work is provided for, leading to the degree of A.M., and there is a preparatory school. Instruction in military science and military drill is a part of the curriculum and obligatory for all students. The State provides one full State scholarship for each senatorial district, and in addition 26 scholarships for tuition only, to be distributed among the counties in order of priority of application; there are also other scholarships. In 1922–23 the grounds, buildings and other property were valued at over $700,000; Henry Williams Woodward Hall, the science building, was erected in 1900; the library contains about 15,000 volumes. The annual income recently was about $90,000; the students number about 200, and the faculty 17.

SAINT JOHN'S COLLEGE, an institution in New York, opened 24 July 1841, under the auspices of the Roman Catholic Church. For its history and present development see FORDHAM UNIVERSITY.

SAINT JOHN'S EVE. See JOHN'S, EVE OF SAINT.

SAINT JOHN'S RIVER, Quebec, the local name near the town of Saint John, of the Richelieu River (q.v.).

SAINT JOHN'S UNIVERSITY, Collegeville, Minn., founded in 1857 and chartered the same year, is a Roman Catholic institution in charge of the Order of Saint Benedict. In 1869 the school was granted power to give degrees; and in 1878 it was further empowered by Leo XIII to grant the degrees of doctors in theology, philosophy and canon law. In 1883 it received from the legislature of Minnesota the title of University. The institution comprises preparatory, commercial, academic or high school departments; the school of arts and sciences or collegiate department; and the theological school or seminary department. The courses lead to the degrees of B.A., M.A. and Ph.D. The location of Saint John's is ideal, the grounds comprise over 100 acres and the buildings are massive and imposing structures. The average annual attendance of students is 450–475; the faculty numbers 34.

SAINT JOHN'S UNIVERSITY, Toledo, Ohio, under the direction of the Fathers of the Society of Jesus was opened in September 1898 and as "The Saint John's College of Toledo, Ohio," was incorporated 22 May 1900. On 29 Aug. 1903 with the corporate title changed to "The Saint John's University of Toledo, Ohio," the power to grant degrees under an amended charter, was ratified by the Secretary of State. Well equipped buildings and grounds offer all possible facilities for higher education. An undergraduate department consists of a four years' course in the study of English composition and literature, Latin and Greek, German, French, history, algebra and the principal business courses. The collegiate course extending through four years, is known as the college course of liberal arts, which, including mathematics, natural science, a higher course in religion, a study of history, foreign languages and a course in mental philosophy leads to the degrees of B.A., B.S., Litt.B. and Ph.B. A law department also offers a three years' course of studies necessary for admission to the Bar. The average annual attendance of students is from 300 to 350; the faculty numbers 23.

SAINT JOHN'S-WORT, a large genus (*Hypericum*) of plants of the family *Hypericaceæ*. They are to be found nearly everywhere in the temperate and torrid zones, and are often shrubs or small trees. The foliage is pellucid punctate or black-dotted and the leaves and blossoms emit, when bruised, a strong resinous-aromatic odor, and have a bitter taste, due to an oil possessing astringent and tonic properties, and which held a prominent place in old pharmacopeias. The flowers are perfect and numerous, borne solitary or in cymose panicles and are generally yellow. *Hypericum perforatum,* to which formerly the name of Saint John's-wort was limited, has its leaves marked with pellucid dots, somewhat simulating perforations. It is a European plant which has become naturalized in our country, and is a troublesome weed. It is a very smooth, shining herb, sometimes two feet high, with opposite oblong leaves and bright-yellow flowers in broad terminal cymes. Both petals and leaves are black-dotted. Its yellow, acrid, resinous juice will stain the skin purple and was believed by Dr. Torrey to cause inflammatory trouble in cattle. The dried plant dyed wool yellow.

Tradition states that the Saint John's-wort was so called because blood-like spots appeared on its foliage immediately after the Saint was beheaded and reappeared on the anniversary of the date. It was regarded as a universal panacea and perhaps possessed some curative qualities, especially in external use. It was supposed to preserve persons and property against lightning, but was still more in demand as a preventive of witch-visits or those of other evil spirits, perhaps because, according to tradition, a baptized person anointing the eyes with the green juice of its inner bark could see witches. Italians gave it the name of "devil-chaser." It was not only worn as an amulet, but was hung over doors and windows; yet it was not safe to tread on it after dark, since the luckless wight that bruised it might be snatched up on a fairy horse and carried about all night. Saint John's-wort, plucked on midsummer night's eve, took its place among the love-charms.

SAINT JOHNSBURY, Vt., town, county-seat of Caledonia County, on the Passumpsic River, and on the Boston and Maine and the Saint Johnsbury and Lake Champlain railroads, about 34 miles east-northeast of Montpelier. It was settled in 1786 by Jonathan Arnold and associates, and incorporated in 1884. It is in an agricultural region in which there is considerable attention given to dairying; but the principal industry is the manufacturing of the Fairbanks scales. There are about 1,000 men employed in the Fairbanks Scales Works and an equal number in the combined smaller manufactories. There are nine churches and one hospital. The educational institutions are the Saint Johnsbury Academy, Notre Dame Academy, public and parish schools, Saint Johnsbury Athenæum and a free library, and the Fairbanks Museum of Natural History. The four banks have a combined capital and deposits of $2,000,000. The government is vested in a board of trustees. Pop. (1920) 7,163.

SAINT JOHNSVILLE, N. Y., village in Montgomery County, 55 miles west of Albany, on the north bank of the Mohawk River, and on the New York State Barge Canal and the New York Central Railroad. It manufactures threshing machinery, gas engines, motors and piano actions, and has knitting mills and milk condenseries. Pop. 2,469.

SAINT JOSEPH, Mich., city, county-seat of Berrien County, on Lake Michigan, at the mouth of the Saint Joseph River, on the Cleveland, Cincinnati, Chicago and Saint Louis, the Pere Marquette and the Michigan Central railroads, about two miles south of Benton Harbor and 23 miles north by west of Niles. It has steamer connection with the Lake Michigan ports, including Chicago, by means of the Graham and Morton Transportation Company and the Benton Transit Company, and is an attractive summer vacation resort. It is in an agricultural region, noted for its peaches and other fruit. The chief industrial establishments are flour and grist mills, fruit-basket and box factories, machine shops, foundries and hosiery mills. The educational institutions are a high school, public elementary schools, parochial schools and a public library. Mineral baths, Silver Beach and Lake Front parks, Berrien County Country and the Edgewater clubs add to the city's attractiveness. Its history dates back to Father Allonez's visit in 1669 and to a mission and small fort founded in 1700 and destroyed by Pontiac in 1762. Finally settled in 1829 it was incorporated as a village in 1836 and as a city in 1892. Pop. (1920) 7,251.

SAINT JOSEPH, Mo., city and county-seat of Buchanan County, the third city in size and wealth in Missouri, 131 miles southeast of Omaha and 60 miles north of Kansas City, is situated on the east bank of the Missouri River, in Northwestern Missouri, near the junction of the four States of Missouri, Kansas, Nebraska and Iowa, and is the central gateway of the lower group of Missouri River cities. The city extending for three miles along the river front stands on high rolling ground, entirely above and free from floods or overflow, and covers an area of about 13 square miles. Elwood, Kan., a residential suburb, is reached by a steel railroad bridge 4,270 feet long. With its sightly hills, winding avenues, parks, lake and driveways, Saint Joseph is a picturesque, healthful and desirable place of residence. The railroads serving Saint Joseph are the Santa Fé System, Burlington Route, Rock Island Lines, Chicago Great Western, Missouri Pacific System, Saint Joseph and Grand Island Railroad (Union Pacific System). Through their immediate connections Saint Joseph is served by every mile of railroad in the Northwest, Southwest and Central West. Two electrical interurban lines operate from Saint Joseph into the

surrounding districts — both passenger and freight.

As compared with other cities in the United States, Saint Joseph stands among the first in bank transactions according to population; third as a dry-goods jobbing centre; fifth largest live-stock market; seventh largest candy manufacturing centre; and has the largest and best hard winter-wheat mill in the world.

Predominating Industries.— The leading industrial and commercial activities of Saint Joseph are manufacturing, merchandise distribution and livestock and grain marketing. The development of manufacturing in Saint Joseph has been steady and progressive. The principal manufactures are packing-house products, milling products, clothing, candy, shoes, dairy products, harness and saddlery tanning, foundry and machine-shop products, furniture, trunks, soap and glue. The annual value of manufactured products is $110,000,000; value of merchandise sold at wholesale and jobbing annually, $100,000,000; value of farm products marketed annually, $200,000,000; commercial freight received and forwarded annually amounts to 2,750,000 tons. The post-office receipts (1918) were $502,320.20; bank clearings (1918) $991,532,996; total bank transactions (1918) $4,935,993,907. Eighteen bank and trust companies transact business in Saint Joseph.

Stock Yards.— A great impetus was given to the growth and prosperity of the city by the improvements and extensions made at the stock yards, which were begun in the year 1897. The stock yards proper consist of 500 acres of land, 80 acres of which are covered by the pens and sheds. There are 20 miles of railroad tracks upon the grounds and five packing-houses engaged in the slaughtering of animals, three of them, Swift and Company, Morris and Company and the Hammond Packing Company, erected large and extensive plants here at a cost of several millions of dollars.

Public Buildings.— Chief of these are the county courthouse, the Federal building and post-office, the union railway station, the auditorium, livestock exchange, the Corby-Forsee building, housing the Commerce Club, the Central Washington Park and Carnegie libraries; 43 school buildings, of which the most important are the Robidoux, Beaton and La Fayette high schools, and central high school and junior college. Other important buildings are those of the Young Men's and the Young Women's Christian associations, Scottish Rite Cathedral, Masonic Temple, the Home for Little Wanderers, the Buchanan or No. 2 State Hospital for the Insane, the Sisters of Saint Joseph, the Noyes and Ensworth hospitals and the numerous fine church structures of different sects. Attractive city features include Krug Park, Bartlett Park, Noyes Boulevard, Lake Contrary, the State fish hatchery, government weather observatory, two large opera houses, theatres and numerous places of amusement.

Government and Civic Conditions.— The commission form of government is in force in Saint Joseph. The city owns an electric-light plant, representing in its original construction an expenditure of over $100,000, since enlarged to twice its present capacity in order to meet the demands for additional street lighting, resultant from the growth of the municipality; cheap fuel is furnished by natural gas. The gas plant, which was built in 1878 and has been in almost continuous extension and improvement since that time, now represents an investment of about $1,000,000. It has in use 56 miles of main pipe and has a capacity of furnishing 2,000,000 cubic feet of gas every 24 hours. Saint Joseph is supplied with water through an extensive system of waterworks, first built in 1879 and improved and extended since that time, until it now represents in cost of construction an expenditure over $1,800,000. The assessed valuation of property in the city, made upon a basis of about 60 per cent of its actual value, is $53,624,970; the city's bonded indebtedness is $722,550; the tax rate is $1.25 per $100. There is no floating debt, this being prohibited by city charter. For maintenance and operation the city expends annually an average of $1,200,000; the principal items being education, $500,000; fire department, $157,000; police department, $130,000; streets, $120,000; water, $50,000; lighting, $34,000.

History.— In 1826, Joseph Robidoux, born in Saint Louis of French parentage, established a trading post at this point, known as the "Blacksnake Hills," and thus became the founder of the city, which he later christened with his own name. For hundreds of miles on every side the whole country was then an unbroken wilderness, inhabited only by the aborigines, who gained a scanty subsistence by trapping and hunting. The furs and pelts of the wild animals they killed soon became a source of extensive traffic between the trader and his Indian neighbors. The famous "Platte Purchase" was accomplished through a treaty with the Indians, dated 17 Sept. 1836. The trading post grew into a town, incorporated in 1845 and then into a city, incorporated in 1851. Its growth at first was not rapid, but steady and gradual. Planted, however, in the midst of one of the finest and wealthiest agricultural sections of the United States, and drawing to itself the larger part of the trade that came from the country to the westward, it later on began to assume a more vigorous and rapid growth. In 1880 it had a population of 32,431; (1890) 52,324; (1910) 77,403; (1920) 77,939.

Bibliography.—Barns, 'The Commonwealth of Missouri' (1877); 'Encyclopedia of the History of Missouri' (1901); 'History of Buchanan County, Missouri' (1881); 'Buchanan County and Saint Joseph' (1898); 'Saint Joseph Directory' (1903).

H. D. ENNIS,
Secretary of the Commerce Club of Saint Joseph.

SAINT JOSEPH, an island in Lake Huron belonging to Canada. It is at the mouth of Saint Mary's River and near the mainland of both Michigan and Ontario. There are many high bluffs and large rocks on the coast, but nearby the whole of the surface is covered with trees, shrubs and flowers.

SAINT JOSEPH, (1) A river in Michigan whose source is in Hillsdale County. It flows west-northwest, then south into Indiana, west, then northwest, returning to Michigan and entering Lake Michigan at Saint Joseph (q.v.). South Bend, Ind., is on the banks of this river, at the head of navigation. Its total length is about 250 miles. (2) Another river of the same name rises in the southwestern part of Michigan, crosses the northwestern corner of Ohio, enters Indiana and flows southwest and unites with Saint Mary's River at Fort Wayne, to form the Maumee (q.v.). Its total length is about 100 miles.

SAINT JOSEPH'S SEMINARY, a theological school at Yonkers, N. Y. The local name for the place is Dunwoodie. The seminary belongs to the archdiocese of New York, but the attendance is not limited to any locality. The history of the school begins as far back as 1833, when Bishop Dubois began at Nyack, N. Y., the erection of a school on the plan of Mount Saint Mary's (q.v.), Emmitsburg, Md. The corner stone was laid 29 May 1833, but the institution was destroyed by fire before it was finished. Later the project of establishing the school in Brooklyn was proposed, but soon abandoned. The next location, selected by Bishop Hughes, was Lafargeville, Jefferson County, N. Y. A school was opened here, 20 Sept. 1838; but it was soon abandoned, as it was too far from New York. The Lafargeville school was intended for both theological and secular studies. The school was removed to Fordham, N. Y., in 1840 and is now known as Saint John's College. The theological department was moved, October 1864, to a new home and Saint Joseph's Seminary, Troy, N. Y., was opened in charge of professors from the University of Louvain, Belgium. The present seminary at Yonkers is on a beautiful tract of land and built on the eminence known in history as Valentine Hill. The land was purchased in 1890 by Archbishop Corrigan (q.v.), and the new seminary was dedicated 12 Aug. 1896 and placed in charge of the Sulpician Fathers. In May 1898, one of the gifts presented to Archbishop Corrigan in honor of his silver jubilee was the certificate of the entire liquidation of the debt upon the seminary. The seminary chapel was built entirely at the personal expense of Archbishop Corrigan.

The conditions for admission are (1) a well-formed desire to study for the priesthood, (2) entrance examination, (3) must have completed a good classical course, (4) the permission of the bishop of the diocese to which the applicant belongs. The courses of study demand a large amount of work: as, the course in Sacred Scripture is for five and one-half years and the regular class work is supplemented by an academy or seminary composed of interested students who meet once a week to discuss particular questions. In connection with this department there are two courses of Hebrew and instructions are given in other Semitic languages. All the other courses are equally thorough. In addition the students regularly visit hospitals, penal and charitable institutions and teach in Sunday schools. In 1917 there were connected with the seminary 13 professors and instructors and 246 students. The library, in the centre of the main building, contains about 30,000 bound volumes.

SAINT-JUST, săn zhüst, **Antoine Louis de,** French patriot: b. Decize (Nièvre) 25 Aug. 1767; d. Paris, 28 July 1794. He studied law at Rheims, but devoted himself almost exclusively to literary pursuits until the outbreak of the Revolution, when he became one of its most notable participants. His political career as deputy from Aisne to the convention at Paris in 1792 began with his famous oration setting forth his reasons for voting for the death of Louis XVI. Because of his youth he has been called the instrument of Robespierre, with whom he was closely associated throughout the Revolution. But the extreme measures attributed to him were undoubtedly undertaken through intensity of personal conviction. In 1793 he was made president of the convention, and in 1794 was responsible for the execution of Danton, Hébert and Desmoulins. But the Revolutionary Tribunal, whose acts he had so mercilessly directed, was destined to be dissolved. In July 1794 Robespierre and Saint-Just were executed upon the same scaffold by order of the Committee of Public Safety. The political works of Saint-Just were published in 1833–34. Consult Fleury, 'Saint-Just et la Terreur' (1851); Hamel, 'Histoire de Saint-Just' (1859); Aulard, 'Les orateurs de la législative et de la convention' (1885).

SAINT KILDA, Scotland, an island of the outer Hebrides, belonging to Harris in Inverness-shire and lying 40 miles west of North Uist. It is three miles long by one mile broad with shores rising in perpendicular cliffs from the water's edge. The highest point is Conna-Ghair, a gigantic precipice 1,220 feet high. The richness of the verdure softens an otherwise bleak and forbidding landscape. There are about 40 acres of arable land and sheep are raised. Sea-birds, petrels, etc., which supply feathers, oil and meat, form the chief source of income. The fisheries are productive but neglected. The population from 110 in 1851 had dwindled to 77 some 50 years later. The natives speak Gaelic and inhabit a little village at the head of East Bay.

SAINT KITTS, West Indies. See SAINT CHRISTOPHER.

SAINT-LAMBERT, Jean François, zhŏn frăn-swă săn lăn-bâr, MARQUIS DE, French philosopher and poet: b. Nancy, France, 26 Dec. 1716; d. Paris, 9 Feb. 1803. He was for many years attached to the court of Stanislaus Leszczynski of Poland when that prince lived in Lorraine, and for a time he served in the French army. He won literary recognition by a volume of descriptive verse, 'Les saisons' (1796), which received extravagant praise at the time but possessed little merit. His present fame seems to rest upon the fact that he was the successful rival in love of both Voltaire and Rousseau. His 'Fugitive Poems' (1759) and 'Stories' (republished 1883) possess considerable merit and his 'Universal Catechism,' though somewhat materialistic, was approved as a text-book on ethics by the Institute in 1810.

SAINT LAMBERT, Canada, town of the province of Quebec, opposite Montreal, with which it is connected by the Victoria Bridge across the Saint Lawrence River and on the Grand Trunk Railway. It has both Protestant and Roman Catholic academies. Pop. 3,344.

SAINT LAWRENCE, lâ'rĕns, an island belonging to Alaska, in Bering Sea, intersected by long. 170° W. and lat. 63° N. It is about 100 miles long and varies from 10 to 35 miles in width; it is about 500 feet at the highest point

above the sea, though some of the mountain peaks attain a height of some 2,000 feet. It is inhabited by Eskimos who are engaged chiefly in fishing.

SAINT LAWRENCE, Cape, Canada, the northwest projection of Cape Breton Island, Nova Scotia, on the Gulf of Saint Lawrence.

SAINT LAWRENCE CANALS. See CANADIAN CANALS.

SAINT LAWRENCE RIVER AND GULF. The Saint Lawrence River is in North America; its head-waters are about long. 93° W., and its mouth near long. 66° W. The total length from the source of the Saint Louis in Minnesota to its entrance to the Gulf of Saint Lawrence at Anticosti Island is about 2,200 miles. The area of the basin is about 530,000 square miles. The area of the water surface of the Saint Lawrence River system, including all the rivers and lakes, is 95,300 square miles. The area of that portion of the basin which is drained by the Great Lakes is nearly 200,000 square miles. The length of the shore line of the Great Lakes and their rivers is 5,400 miles. This system is the only large one in North America whose main stream flows from west to east and the only large system, except Columbia, whose main stream does not run in the direction of the greatest extent of the continent.

Formation of Lakes.— Prior to the Glacial period the land area of this region was greater than at present and board valleys were excavated by the rivers. With but few exceptions the last formed rocks in this great depressed region belong to the latest formations of the Palæozoic strata. The whole region was under ice-cover during the Glacial period. This vast body of ice moved southward, elevations were worn down, the rocks were carved in fantastic designs, new grooves were formed and the entire topography was changed. In addition to change of form produced by the movement of the great mass of ice, other and equally great changes were made by the vast amount of débris deposited by the glacial drift. Of this débris one peculiar formation is found in the rocks in Ohio, western New York and other places, where angular and somewhat rounded stones are imbedded in bowlders or striated with rocks. Another is the arrangement of the bowlders, showing in many places their removal from their original beds. Sand, clay and gravel were washed by the streams into long lines, so that in the Saint Lawrence basin great sand belts extend across the country for miles and are usually found on the lowlands, at the places that were once edges of ice-coverings. The rocks formed before the Glacial period are in some places covered by glacial deposit for from 100 to 200 feet. On the south side of the Saint Lawrence, at the lower foot-hills of the Adirondacks, may be found rock layers considerably below the surface. Old river channels were dammed, old valleys filled up and new drainage channels formed. The new sub-basins were changed by the glacial deposit and the removal of former divides. The depressions where the Great Lakes are now were formed in part when the southern margin of the glaciers was obstructed north of the divide which extended through New York, Ohio, Indiana, Illinois and toward the Northwest by the ice-block. The glacier south of the divide discharged its melted waters through streams flowing generally south. The outlets of the glacial streams from the north ice-covering were at first southerly. One was through New York State, near Ithaca and through a portion of the Mohawk and Hudson River valleys to the Atlantic Ocean. Another was south of Lake Michigan along channels into the Mississippi Valley and to the Gulf. Another was from Lake Erie by way of Fort Wayne. At first there were only small but numerous depressions along the south margin of the northern glacier. They grew broader as the ice retreated slowly and gradually merged into each other until the vast lake basins were formed which still preserve proof of their age in the Palæozoic strata which have undergone but little change. Mechanical and chemical agencies and erosion removed rocks and graded the lake beds. The ancient beaches of the early lakes show that at one time the water occupied a greater space than at present. The Iroquois beach, south of Lake Ontario, is quite distinct and shows that the old lake was much larger than the present Ontario. (See NEW YORK). The ancient lake is supposed to have extended north to the glacier. There are shore-line marks south of Lake Erie some distance from the present shore line and from 175 to 220 feet above the lake as it is now. East of Lake Huron are beaches showing a shore line from 25 to 260 feet above the present lake. This record of an ancient large lake is called Algonquin beach. The broad beaches of the ancient lake, of which the present Superior is a part, are in the north shore and extend the whole length. They range from 100 to 600 feet above the surface of the present lake. The soils within the area of the lake-beaches now beyond the lake limits differ from the soils farther inland. They possess many of the characteristics of inundated lands. The beach lands are not alike; near lakes Ontario and Erie are masses of yellow sands, in some parts approaching a gravel and between are large clay deposits. The Lake Superior beaches of the old lake show broad clay coverings, pinkish in color. The combined area of the lakes north and west of Superior which flow into Superior is equal to one of the large lakes. See articles on each of the Great Lakes.

The Rivers.— The main stream of the system was the last to assume its present form, when the ice covering left the region and the waters began the formation of channels extending to the sea. The streams from the divides gradually made their way to the lowest points of the valley and entered the main stream. The main outlet channel, or the river Saint Lawrence, may be said to have its source at Lake Ontario and to extend to below Quebec, to the island of Orleans, where it becomes an estuary. From Lake Ontario until it becomes a tidal stream it is a surface river, of which the waters are remarkably clear. The distance from Lake Ontario to the Gulf is 750 miles. The descent from Lake Ontario to tide water is 230 feet. The Saint Lawrence forms the boundary line between the United States and Canada to long. 74° 15′ W., after which its course is wholly in Canada. In width the Saint Lawrence varies from one to three miles, until it broadens into a very wide stream; at Cape Gaspé it is over 50 miles wide. Just after leaving the United States boundary, the river expands and forms what is called Lake Saint Francis and a little above the city of Three Rivers is another expansion called Lake Saint Peter. The chief tributaries are the Ottawa, Saint Maurice, Saguenay, from the north, the Chaudière, Richelieu, Saint Regis, Racquette, Grasse and Oswegatchie from the south. The Richelieu brings to the Saint Lawrence the waters of Lake Champlain. There are numerous beautiful islands in the Saint Lawrence; at the beginning of the main outlet near Lake Ontario, there is a group (about 1,500 in all) called the «Thousand Islands.» These islands are famous summer resorts.

The Estuary and Gulf.—The estuary, beginning below Quebec, is 350 miles long, with an extreme width of 35 miles until it flows beyond Anticosti Island, where it widens, as has been mentioned at Cape Gaspé to over 50 miles. The greater part of the Gulf and the estuary are submerged portions of the river valley. A submerged river channel 800 feet wide has been traced to the eastern edge of the continental plain, about 100 miles from the present coast line. The marine shells found in the sand and clays above Montreal show that at one time the estuary began much farther up the stream than at present. The Gulf of Saint Lawrence has at its mouth in the large island, Newfoundland. It enters the Atlantic by three channels; Cabot Strait, between Newfoundland and Cape Breton, about 65 miles wide; Strait of Belle Isle, between Newfoundland and Labrador; and Gut of Canso, between Nova Scotia and Cape Breton Island. The principal islands in the Gulf are Prince Edward Island, Magdalen Islands and Anticosti.

Navigation.— Ocean steamers of the largest size ascend the Saint Lawrence to Quebec and large vessels go as far as Montreal. Above are several rapids and in Niagara and Saint Mary's River are falls. Steamers coming down the river often pass through the channels between the rocks of the rapids, but ascending the stream they have to go through canals which have been built to overcome the obstructions to navigation. The Welland Canal (q.v.), in Canada, furnishes a means of going around the Niagara Falls. Two canals, one on the American and one on the Canadian side, have been built at Saint Mary's Falls. Navigation on the rivers and lakes is closed in winter. The average number of days the Lachine Canal is opened during the year is 220. See CANALS; for history, see CANADA; UNITED STATES.

SAINT LAWRENCE STATE HOSPITAL, a State institution for the insane situated on the Saint Lawrence River near Ogdensburg, N. Y. It is built on the cottage system and consists of three principal groups and two detached cottages. The central group includes a central administration building and 12 cottages and utility buildings which are detached except for a one-story fireproof corridor to facilitate communication. The cottages are two stories in height and are substantially and beautifully constructed of Potsdam sandstone and limestone. The cottages for men are on the west and those for women on the east of the administration building. The first is called Reception Cottage East or West and it is here the patients are admitted from home accompanied by a trained nurse sent from the hospital for that purpose. Every effort is made to give this cottage a home-like appearance and to avoid the depressing influence of a large institution. There is a cottage for convalescents, the doors of which are never locked and the patients are permitted to come and go at will. Other cottages are for the disturbed and noisy class, for the quiet and harmless and for working patients. The Infirmary Group and Group Number Three are one-fourth mile from the central group and each accommodates about 400 patients of the chronic classes. The Garden Cottage and Farm Cottage are each one mile from the administration building and are occupied by patients who are employed at gardening and farming. The Saint Lawrence State Hospital is chiefly remarkable as one of the first institutions to abandon the Kirkbride or block system which dominated asylum construction in this country for 50 years and to establish in its stead a simple and more convenient plan. The first medical superintendent was Dr. Peter M. Wise, to whose genius the hospital owes its plan and organization. The hospital was opened for the reception of patients 9 Dec. 1890, but was not completed until 10 years later. The grounds and buildings cover an area of 1,219¼ acres, of which 930¼ acres are under cultivation. There are accommodations for 2,174 patients and 397 employees. The value of real estate including buildings, is $3,006,750; value of personal property including furniture, etc., $179,200. The percentage of patients employed in useful work is males 63 per cent, females 50 per cent; the estimated value of farm and garden products raised in a recent year was $65,920.70; of articles made or manufactured by patients during the year, $33,941.92. The disbursements amounted to $361,087.40; miscellaneous receipts, $399,116.46; the annual expenditure per patient was $208.

SAINT LAWRENCE UNIVERSITY, Canton, N. Y., was chartered April 1856 for the purpose of «establishing, maintaining and conducting a college for the promotion of general education and to cultivate and advance literature, science and the arts, and to maintain a theological school.» Like all other colleges of the State, it is a constituent part of the educational system called the University of the State of New York. It now includes the College of Letters and Science, the Theological School, the Law School, the New York State School of Agriculture. Each department is independent of the others in its faculty and funds and in the instruction and government of its students. The College of Letters and Science offers courses leading to the degrees of bachelor of arts and bachelor of science. From the first, women have been admitted on the same terms as men. The by-laws of the corporation, adopted in 1856, provide that «the College of Letters and Science is and shall remain an unsectarian foundation.» Its undenominational character has been consistently maintained. In 1857 the legislature granted to the college $25,000, of which $10,000 was to be expended for «books and apparatus» and $15,000 was to be kept as a permanent fund. The remaining productive funds of the college,

which now exceed a half million dollars, have been the result of private benefactions.

The Theological School, as provided by the by-laws of the corporation, "is and shall remain an institution especially intended and organized for the preparation and training of persons for the ministry of the Universalist Church." It was opened by Ebenezer Fisher, D.D., in April 1858. The first class was graduated in 1861. The degree of Bachelor of Divinity is granted upon completion of certain courses. Under the original charter the corporation was a self-perpetuating body. The Laws of 1868 amended the charter by providing for the election of trustees by the New York State Convention of Universalists. This law remained until 16 March 1910, when it was repealed and the power of the corporation to fill vacancies in its membership was restored.

The establishment of a law school was authorized by chapter 288 of the Laws of 1869, passed 22 April 1869. A law school was maintained in Canton from 1869 until 1872, and two classes were graduated. In 1903 the Brooklyn Law School, which had been incorporated by the Regents of the University of the State of New York, was placed under the control of the Saint Lawrence University. A three-year course leads to the degree of bachelor of laws.

The New York State School of Agriculture was established pursuant to chapter 682 of the Laws of 1906, passed 31 May 1906, and is maintained in the State of New York. It comprises an agricultural division and a domestic science division for women. No degrees are conferred on the graduates of this school as such, but certificates are given on the completion of the prescribed courses. Commodious buildings completely equipped and extensive grounds offer all facilities for the different departments of instruction. The university faculty numbers 80 and the average annual attendance of students is 1,650.

ST. LEGER, sānt lĕj'ĕr, or sĭl'ĭn-jĕr, **Barry,** British soldier: b. 1737; d. 1789. He served in the siege of Louisburg in 1758, and under Wolfe at Quebec, and checked the flight of the British forces at the Heights of Abraham. He was also the leader of the expedition against Fort Stanwix in the American Revolution. At the close of his career in the British army, in 1784, he was commandant of the royal forces in Canada. His 'Journal of Occurrences in America' was published in London in 1780.

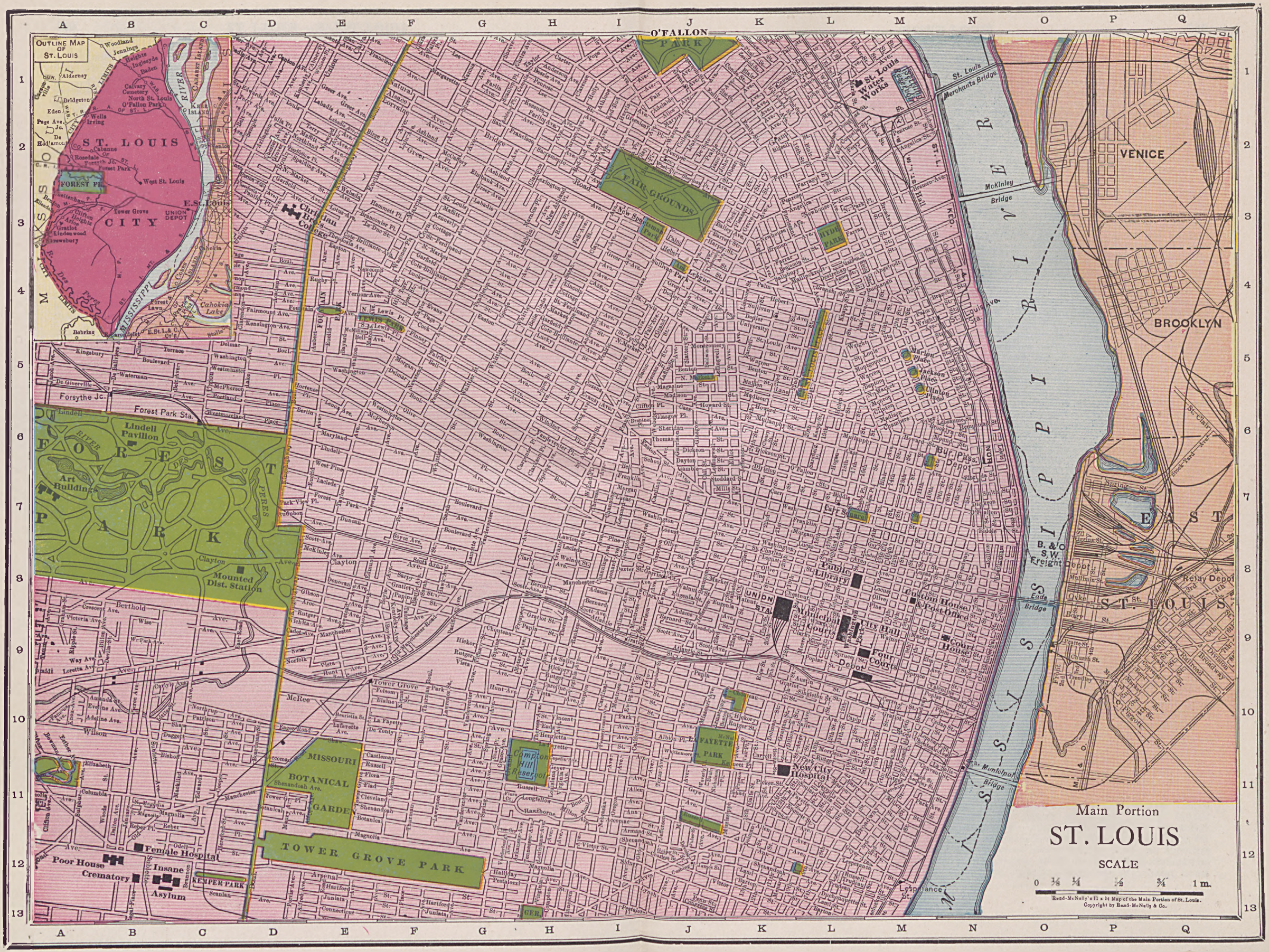
SAINT LOUIS, popular pronunciation sānt loo-is, Missouri, city and port of entry, the metropolis of the State. By the Federal census of 1920 it is given sixth place in population among the cities of the country. Its location is on the west bank of the Mississippi River, 20 miles below the mouth of the Missouri River. The site averages 100 feet above all flood waters and 500 feet above the sea.

Topography.— The city directrix is an arbitrary, level set in the wharf. It is 413.52 feet above the mean tide in the Gulf of Mexico, as established by the Mississippi River Commission. A high stage of the river covers the directrix. A low stage is 30 feet below the directrix. There is a recorded difference of 43.35 feet between the highest and lowest stages of the river. On the 27 June 1844 the water overflowed the directrix 7.58 feet. The lowest stage was on 2 Jan. 1900 when the water dropped 35.77 feet below directrix. Practically all of Saint Louis is well above the highest known stage of the river.

The site of Saint Louis is a succession of gentle ridges and depressions, each ridge toward the west rising higher. Broadway, the 5th street from the river, is 460 feet above the gulf level. At 17th street the altitude is 500 feet. At Grand avenue, the 36th street parallel with the river, the ridge is 540 feet. At the western city limits the elevation is 600 feet. Westward from the city the ridges rise gradually until the plateaus of the Ozarks attain altitudes of 1,000 feet. The area of the city is 61.37 square miles, or 39,276.8 acres. The boundaries are two curved lines, the Mississippi River on the east, an arbitrary limit on the west separating the city from Saint Louis county. The river front from north to south is 19.15 miles. At the widest part, about midway of the two curves, the distance across the city is 6.62 miles. The length of the western boundary is 21.27 miles. The length of the city from the northern point to the extreme southern tapering end is 17 miles by air line. There has been no increase in the city's area since 1875. Of 936 miles of streets 665 are paved. The city has 851 miles of public and district sewers. In topographical and geographical character Saint Louis is of the Ozarks — the foothills. Within the city limits are found the limestone ledges and the caves which are distinguishing features of the Ozarks. For earlier generations the water supply was drawn from fine springs which boiled up from underground watercourses, just as they do now throughout the Ozarks. As the city grew sewage was drained into sinkholes leading down to the underground waters. Epidemics of typhoid and cholera became frequent. Cholera carried off one-tenth of the population in a single year — 1849. Sanitary regulations compelled the closing of all wells. Springs were diverted into sewers. About 1875 the river became the exclusive source of water supply, under a scientific system of waterworks described further on in this article.

Climate.— Saint Louis is in lat. 38° 38′ and long. 90° 15′. The latitude ensures what may be termed a medium temperature of the United States. The meridian from which central time is fixed is about 12 miles east of Saint Louis. Standard central time for Saint Louis, therefore, is only about one minute faster than mean solar time. The climate is influenced favorably, in some degree, by the two large rivers adjacent. A prevailing breeze up the Mississippi relieves the heat of summer. The nearby waters temper the cold waves of winter. The highest temperature in 1915 was 94°; the lowest — 4°. The mean temperature for the year was 56.3°. The rainfall in 1915 was 49.28 inches. The average annual rainfall from 1837 to 1915 inclusive was 40.08. The navigable channel depth of the river from Saint Louis to the mouth of the Ohio during most of the year is seven feet, and from Cairo south, 12 to 14 feet.

Commerce and Industry.— An exclusive privilege to trade in furs prompted the first settlement of Saint Louis in 1764. In 1915 the official report of the trade and commerce of


OUTLINE MAP OF ST. LOUIS
ST. LOUIS
CITY
E. St. Louis
Cahokia
Cahokia Lake
MISSISSIPPI RIVER
Christian Brothers College
O'FALLON PARK
FAIR GROUNDS
St. Louis Water Works
Merchants Bridge
McKinley Bridge
VENICE
BROOKLYN
EAST ST. LOUIS
Lindell Pavilion
Art Building
FOREST PARK
Mounted Dist. Station
Forest Park Sta.
Forsythe Jc.
Tower Grove
MISSOURI BOTANICAL GARDEN
TOWER GROVE PARK
Compton Hill Reservoir
FAYETTE PARK
Female Hospital
Poor House
Crematory
Insane Asylum
KEMPER PARK
UNION STA.
Public Library
Municipal Courts
City Hall
Four Courts
Court House
Custom House & Post Office
New City Hospital
Union Depot
Relay Depot
Main Portion
ST. LOUIS
SCALE
0 1/8 1/4 1/2 3/4 1 m.
Rand-McNally's 11 x 14 Map of the Main Portion of St. Louis.
Copyright by Rand-McNally & Co.

Saint Louis, made by the Merchants' Exchange, claimed "the greatest raw fur market in the world." The sales of raw furs during that year amounted to $5,000,000. From 1764 to 1808, the pelt was the chief article of Saint Louis commerce. Against the protests of the fur merchants of Philadelphia and other Atlantic seaboard cities, the furs of the Indian trappers up the Illinois and as far as the Great Lakes found their way to Saint Louis. During a considerable portion of the colonial period the value of the furs handled at Saint Louis averaged $200,000 annually. Soon after the transfer of the Louisiana Purchase to the United States, fur companies, with headquarters at Saint Louis, were formed. One of these, the American Fur Company, became a strong monopoly. It gradually came into control of the greater part of the fur trade as far west as the Rocky Mountains and as far north as the British possessions, even entering into competition with the Hudson's Bay Company. The American Fur Company had its New York connection through John Jacob Astor. Among other fur companies formed by Saint Louisans were the Missouri and the Rocky Mountain. Saint Louis was the outfitting point for the expeditions and the receiving place for the packs of pelts. In 1820 the Saint Louis trade in furs had reached $600,000. Steam navigation above Saint Louis had just begun. The average annual value of the fur trade was estimated conservatively at not more than $300,000. There were wide variations in the annual outputs. The value of the furs received in 1852 was $1,000,000, buffalo robes constituting one-tenth of the product. After 1860 the Saint Louis fur trade decreased in volume. The Franco-Prussian War in 1871 destroyed one of the principal markets for Saint Louis furs. The trade was an inconsiderable part of the commerce of Saint Louis until about 1890 when a marked revival set in. The development has continued. In 1913 it was officially reported that "Saint Louis is drawing furs from every State in the United States, every province in Canada, as well as Alaska and Mexico."

From 1764 to 1850 the fur traffic overshadowed other business to such an extent that it dwarfed enterprise in varied directions. On the profits in pelts were founded many family fortunes. But the decade from 1850 to 1860 brought important changes, both commercially and industrially, to Saint Louis. Writers pointed out forcibly that this concentration of effort in a single direction was not for the best interests of the city; that development of manufacturing had been retarded. The decade was hardly begun when Saint Louis, having depended up to that time entirely upon water routes, began to plan and build the first railroad lines eastward and westward. The first train west from Saint Louis was run in 1854. In four years, with the population not quite 100,000, Saint Louis contributed $6,400,000 toward the construction of four railroads, one on the Illinois side of the Mississippi, three in Missouri, starting from the city. At the same time local capital, some of it derived from the fur trade, was applied toward the development of the iron industry. Furnaces were established along the river front. Iron ore, of high grade, was brought from two immense bodies of phenomenal character — Iron Mountain and Pilot Knob. During a number of years this output of ore was valued at $1,000,000 annually. Bituminous coal, easily worked and of inexhaustible quantity, was brought from mines a few miles distant on the Illinois side of the river. Pig iron production 40 years ago reached such proportions that Saint Louis confidently expected to become the centre of that industry for the whole country. "The City of the Iron Crown" was the title claimed. But introduction of new processes, the development of lower grade ores of the Lake Superior region and of the Southern States, together with increasing cost of mining at Iron Mountain and Pilot Knob, caused a gradual abandonment of smelting. The manufacture of finished steel and iron products took the place of the pig-iron industry. In 1915 the Saint Louis district was using 350,000 tons of pig iron annually. Of this amount 25,000 tons was of local smelting. Within the year 1916 was organized the Mississippi Valley Iron Company, with a capital of $5,000,000, to increase the local production of pig iron. The many steel and iron industries of Saint Louis have invested $30,000,000. The annual output of these industries is $80,000,000. This includes structural iron, steel castings, foundry and machine-shop products, boilers, wire goods, tin enameled and galvanized iron, cutlery, tools and agricultural implements, stoves, ranges and furnaces.

As the production of iron ore declined, two other ores came into increasing prominence at Saint Louis about 1880. These were lead and zinc. Soon after the close of the Civil War, the government experts predicted coming exhaustion of the Missouri lead deposits. They believed that it was a question of a few years until the galena, which was being found in pocket and nugget formations, at comparatively shallow depths, would fail. Then came the discovery of vast bodies of disseminated lead ore,— lead disseminated in the limestone. About the same time, the zinc ore, which the lead miners called "jack" and which they had excavated in their search for lead and thrown away on the dumps as of no value, came into demand. Missouri mines send to Saint Louis yearly, under normal conditions, 4,000,000 pigs of lead and 4,500,000 slabs of zinc and spelter. To 1916 the value of these iron, lead and zinc ores was estimated at $500,000,000. The present value of the lead industry to Saint Louis, including products from the raw material, not taking into account abnormal demands of the European War, is $10,000,000 a year. Among the industries allied with the iron, steel, lead and zinc are railroad and street cars, $18,000,000; plumbers' and steam fitters' supplies, $7,000,000; electrical manufactures, $18,000,000; paint, paint oils and white lead, $14,500,000.

The early experience with the fur trade and with smelting furnaces taught local capital the policy of diversity in industry and commerce. The Saint Louis district, which includes both sides of the river and extends a few miles beyond the city limits, by the latest official reports, has 3,500 industries, with $407,000,000 capital employed. These industries employ 150,000 people and utilize $203,480,000 raw material. The manufactured products are $550,000,000. By the most recent summary of the Business Men's League, which is the central commercial and civic organization of the city, Saint Louis

manufactures $65,000,000 worth of shoes annually; is the largest manufacturing centre of tobacco in the world; holds first place in the output of American-made chemicals; is the largest lumber market in America; is the larest coffee distributing point in the United States; has the largest horse and mule market in the world.

The introduction of power from the hydro-electric plant at the Keokuk Dam is a recent acquisition. In 1916 Saint Louis utilized 60,000 horse power from this source. Wires from the dam are carried on steel towers. They convey 100,000 volts at low amperage. At the city limits, this current is stepped down to lower voltage and higher amperage.

The Saint Louis Merchants' Exchange reported these sales of leading commodities in 1915:

Dry goods	$75,000,000	Vehicles	$20,000,000
Groceries	72,000,000	Clothing	19,800,000
Boots and shoes	65,000,000	Electrical apparatus	18,000,000
Tobacco	55,000,000	Cars	18,000,000
Hardware	50,000,000	Soap	16,000,000
Lumber	40,000,000	Foundry products	16,000,000
Drugs	25,000,000		
Woodenware	20,000,000		

Saint Louis jobbing houses employ 10,000 people in stores and factories, and send out 1,000 traveling salesmen. The shoes manufactured in a year number 26,500,000, one for every fourth person in the United States. The lumber interests in Saint Louis represents $120,000,000 of capital, own 350 mills located in a dozen States and employ 117,000 people.

Reports to the comptroller of the currency at the close of business 12 Sept. 1916 showed that the banks and trust companies of Saint Louis had deposits of $351,552,035, and total resources of $441,689,464. These returns gave a gain of $50,000,000 in deposits, compared with September 1915. Loans and discounts were $249,353,650, and cash and exchange, $110,205,627. Bank clearings for 1915 were $4,153,520,336, an increase of 6.4 per cent.

The Universal Exposition of 1904, held by the Louisiana Purchase Exposition Company to celebrate the centennial of the acquisition of Louisiana Territory, had an attendance of 19,594,855, of which 12,854,616 was paid. The exposition was financed with $5,000,000 in subscriptions by individuals and corporations, with $5,000,000 bonds voted by the city, and with $5,000,000 aid voted by Congress. Subsequently Congress voted a loan of $4,600,000 which was repaid in exact accordance with the terms of the act. The exposition opened 30 April and closed 1 December. The international jury awarded to exhibitors 45,000 grand prizes, gold, silver and bronze medals. The total revenue of the exposition was $12,185,497, of which $6,243,358 was from admissions, $2,879,843 from concessions, $627,473 from the intramural railroad.

A City of Brick Homes.— Saint Louis is a home-made city. The first settlers built their "houses of posts" with trees cut on the sites. They placed the logs on end instead of horizontally after the manner of "the Bostons" as they called the settlers east of the Alleghanies. They set the ends of these posts on the flat limestone quarried nearby and they chinked the cracks with the strong clay which was everywhere. As the fur traders prospered, they built houses of limestone from the local quarries. The Saint Louisan of the latest decade does not go beyond the city limits for most of the building material. The local quarries are still worked. The brick in enormous quantities is manufactured here. The sand is pumped from the river bed. Lime and cement and sewer pipe and terra cotta,— all are local products of the value of many millions of dollars annually. Before the development of the more cheaply worked mines a few miles distant on the Illinois side, coal was taken from the seams underlying Saint Louis. When U. S. Grant sold cordwood in Saint Louis at $4 a cord, he trimmed the branches with forks and sold these "props" as they were called to the Saint Louis coal mines at $5 a load. This abundance and cheapness of local building material has encouraged two distinguishing characteristics of Saint Louis. This is a city of brick. Even the elaborate and more costly mansions, with few exceptions, are of this material. Saint Louis is a city of homes. In 1910 the census gave 105,650 separate dwellings for 155,563 families, an extraordinary proportion.

Transportation.— The first bridge at Saint Louis was completed in 1874. Crossing of the Mississippi had been by ferriage for 110 years. The bridge was constructed according to plans of James B. Eads, many of the engineering features being original with him. The cost, including the tunnel at the Saint Louis end, was over $10,000,000. To minimize interference with navigation, a height of 55 feet above high water was required. This made necessary a long and an expensive approach over the lowland on the Illinois side. The length of the bridge and tunnel is 6,220 feet. The tunnel passes under the retail businss district and opens on the Mill Creek Valley, a wide depression extending westward from the river to the city limits. About one-third of the city is south of the Mill Creek Valley. When Saint Louis was founded, a small river, fed by many large limestone springs, flowed down this valley. The first settlers dammed the river where the valley narrowed and built a mill where Seventh street is to-day. The dam created a lake half a mile wide and three miles long, known for several generations as Chouteau's Pond. This body of water, with irregular and wooded banks, was preserved until about 1850 when drainage from the growing city made it insanitary. Previous to that time it was a place of general resort for recreation, summer and winter. Travelers described the pond as one of the attractions of Saint Louis. After the pond was drained, an enormous sewer was built to take care of the sewage and the storm water of the central part of the city. When the Eads bridge and tunnel were opened the bed of the old pond became the logical location of terminals needed to accommodate the railroads which until then had maintained terminals on the Illinois side of the river. The railroads proposed that the city acquire land, construct and own terminals and grant use of them to incoming traffic on rental basis. A citizens' organization was formed and engineers employed. These engineers, with the engineers of roads on the Missouri side of the river, prepared what at that time was an elaborate plan for municipal-owned terminals, including depots, freight and passenger, yards and connections with all west side roads, via-

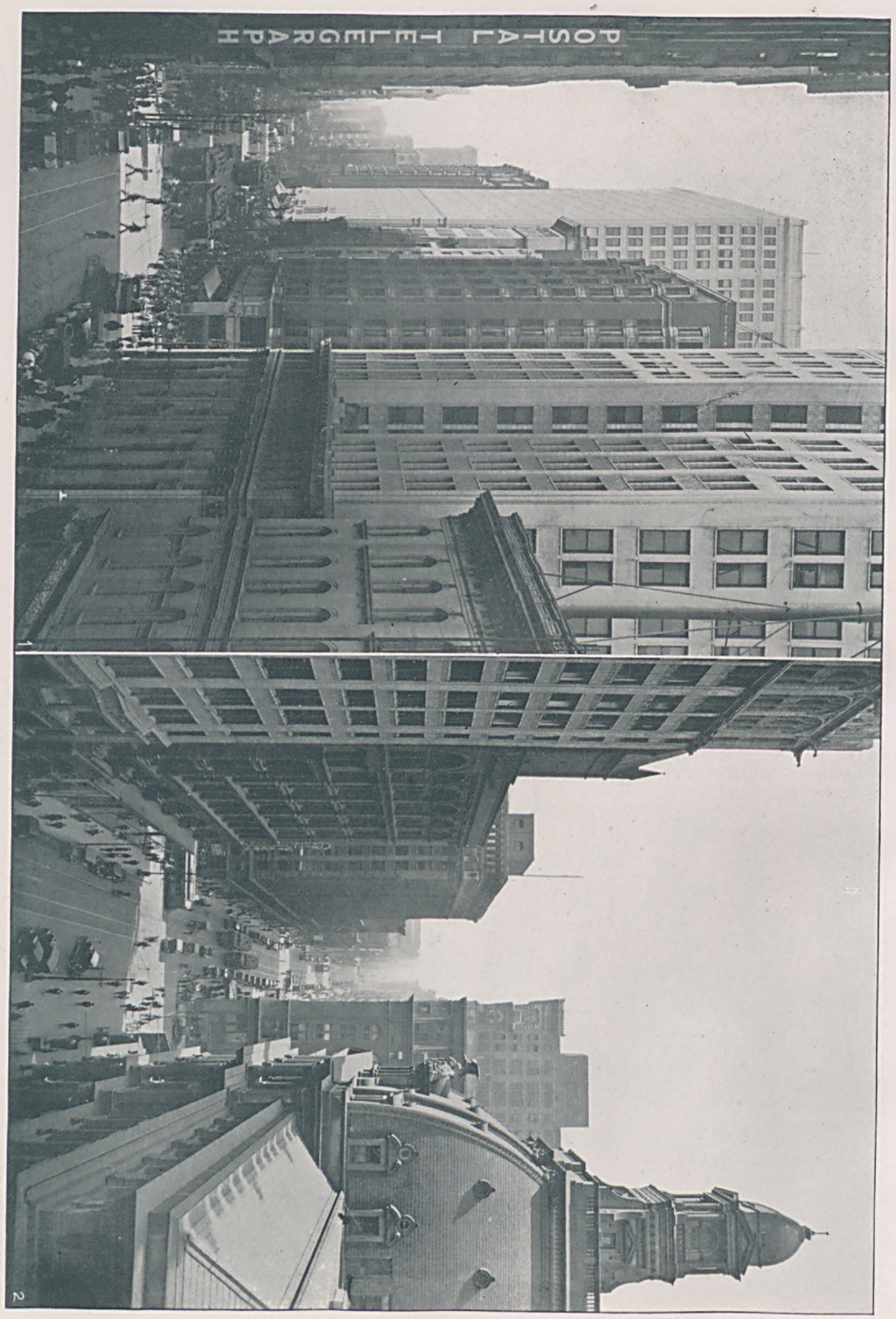




W. C. Persons Photo.

1 Portland Place, one of the exclusive residential streets of the city. Saint Louis is noted for its beautiful homes. It is estimated that 37 per cent of the inhabitants of the city own their own homes

2 Kingshighway, the street of churches. The four pretentious buildings are the Tuscan Building, A. F. & A. M.; the Saint John's Methodist Church (South): Temple Israel; and the Second Baptist Church



1 "Olive Street Canyon." Olive street, looking west from Fourth street. In the right background is the Railway Exchange Building, the largest office building in point of area in the world

2 Olive street, the principal retail street of the city. The scene is looking west from Eighth street. In the left foreground can be seen a portion of the new Arcade Building

W. C. Persons, Photo.

ducts and loading tracks. The entire cost of ground, improvements and equipment was estimated by the engineers at between $5,000,000 and $6,000,000. The property and rights which could have been acquired by the city 42 years ago at less than $6,000,000 are to-day valued at $100,000,000. The municipal government declined to accept the plan of the engineers. This refusal compelled the railroads on both sides of the river to organize a terminal association, buy ground and provide facilities to take care of traffic. No one of the 26 railroad systems passes through Saint Louis. The Wabash and the Missouri Pacific have lines on both sides of the river but Saint Louis is the initial point with all. The rails of the 26 trunk lines cover 64,071 miles, not including controlled systems. The terminal association has expanded its activities until now it operates on both sides of the river. It uses the Eads bridge and tunnel and a second bridge, the Merchants. During the year ending 30 June 1916, the terminal handled 1,215,836 freight cars across the river, which was 100,000 more than in the previous year. In its service the terminal employs 100-ton locomotives which haul 100 cars. It employs 4,457 people. It has a belt line and 225 switches serving Saint Louis industries. During last year it interchanged with 95 connections 3,517,-860 freight cars.

All of the steam railroads use the same passenger terminal. The union station was opened in 1894. At that time it was said to be the largest railroad passenger terminal in the United States. The facilities were enlarged in 1904. The train shed measures 606 by 810 feet. It has 32 tracks, aggregating six and five-tenths miles. Mails and baggage are handled through an extensive subway system underneath the tracks. The main subway is 100 feet wide and 600 feet long. There are six connecting subways leading to adjacent buildings. The station is of the dead end type. All trains back in and head out. They are under the control of an interlocking system said to be the largest in the world. Three towers are equipped with 344 levers. There are 1,827 possible routes to get in and out of the train shed governed by tower No. 1. The average number of passenger trains daily in 1916 was 287. The average number of passenger coaches daily was 1,534. Most of the trains arrive and depart between 7 A.M. and 9 A.M. and between 6 P.M. and 10 P.M. The passenger coaches handled during 1916 numbered 561,410. The average number of tickets sold daily, not including exchange tickets, was 3,175.

Fifteen railroads constitute the terminal association. They are the guarantors of the bonds and other obligations. All other common carriers are given the use of all of the facilities on exactly the same terms and conditions as prevail for the 15 lines. Decline of river traffic was steady after the development of the railroads. In 1915 the inbound traffic by river amounted to only 88,870 tons out of a total of 30,684,935 tons received, and 53,181 tons outbound out of 22,252,181 tons shipped. Until 1916 the river traffic continued to use the old sloped levee, the gangplanks and the manual labor of the negro roustabout. In 1916 the city, in the effort to revive the river traffic, began the building of modern terminals with quay walls, crane elevators, warehouses and railroad connections, the first unit costing $250,000.

The street car system is operated by one corporation, the United Railways Company. It consists of 344 miles of track within the city limits. The fare is five cents for adults and half fare for children. Universal transfers are given. From any point on any line the passenger is sent to any point on any other line by the most direct route even though it requires two changes. During 1915 the number of passengers carried was 227,863,250 on full fare and 4,908,140 on half fare. The transfers used were 124,043,205. The number of cars in daily use was 1,250. Besides paying regular taxes on property and franchises the company is required to pay to the city one mill for every full fare passenger. This yields the city about $250,000 yearly. The company operates under a number of franchises of different lines, the extension of all of these franchises to 1948 under a blanket ordinance being in dispute with the city. The Illinois Traction system enters the city over its own bridge and operates 4.74 miles of track to its terminus at 12th street and Lucas avenue. For the purpose of encouraging traffic to enter the city without paying the charges of the terminal association, the city has build a bridge across the river at the foot of Chouteau avenue. The expenditures upon this bridge, which is without terminals as yet, have been $7,000,000.

Cupples Station Blocks.— Where the tunnel under the central business district opens upon Mill Creek Valley,—the traffic aorta of Saint Louis,— are located the Cupples Station Blocks. They occupy 10 acres of ground. Merchandise of almost every character is received at and shipped from the back doors of these blocks. It goes to railroad points in all parts of the United States. Cupples Station does not merely save drayage between car and store. It conserves labor and economizes time in the business of the largest shippers of Saint Louis. It saves the ordinary wear and tear of merchandise. Hardware, woodenware and groceries are the heaviest lines of goods handled. The goods which pass through Cupples Station in a year are valued at $40,000,000. Two firms, the Simmons Hardware Company and the Cupples Woodenware Company, do $25,000,000 of this business. The amount of merchandise handled daily averages 1,000 tons. A network of switches and sidetracks reaches all parts of the station, entering alongside back doors and into basements. Sixty cars find room on these tracks at one time, and under cover, ready for unloading or loading. A single power plant for all of these blocks supplies light, heat and power, electric or hydraulic. The platforms have 100,000 square feet of space. They are of two main levels, one at the car doors and one a story higher. These levels are connected by nine powerful elevators, operated by the employees of the station. The 30 tenants of the 20 blocks have 50 elevators reaching their various floors. Freight is moved between cars and stores on 5,000 trucks each with capacity for 5,000 pounds and especially designed for easy movement. The trucks represent an investment of $100,000. Traffic between cars and stores is conducted by a trained force which is part of the station service rendered the tenants. During the night, cars having freight billed to

Cupples Station are placed upon the tracks along the platforms. At seven o'clock in the morning 100 station men open the cars, place the goods on trucks and wheel the trucks to the doors of the tenants. In two hours the cars are empty and the contents have been delivered to the several blocks. After nine o'clock the trucks with outbound goods begin to arrive on the upper platform. There the station employees receive the goods and the bills of lading are signed. The shipments are assorted according to schedules which show the order in which cars must be loaded for the several railroads in order to secure the most expeditious movement to destination. A most important part of the service rendered is this assortment of shipments, the loading of the cars and the delivery of the cars to the roads. The trained force and the system reduce to a minimum the time of delivery to the consignee. They afford the shipper great advantage over the usual methods of sending goods by dray to the freight depots. Cupples Station represents in Saint Louis the efficiency of the Bush terminals in New York City and of the 40 warehouses in Pittsburgh.

A New Post-Office Policy.— The new Saint Louis post office, built at a cost of $1,250,000, was completed in 1912. At that time it was said to be the largest building in the world devoted exclusively to the handling of mail matter. It was the first large post office constructed by the United States under an entirely new policy as to location and architecture. The building is substantial in appearance; it is not ornate and is only impressive in size. It is located a considerable distance from the business centre, is adjacent to the railroad terminals and separated from union station by a street. A large subway connects the post office with union station, passing under the 32 tracks. The tunnel is so located as to bring the mail trucks near the mail cars of the train of average length. Inbound mail is loaded on the trucks which are lowered into the tunnel and wheeled into the basement of the post-office. Outbound mail is collected from substations in all parts of the city by auto trucks, hauled to the post-office and delivered on the mail cars by the tunnel route. The new building abounds in automatic traveling devices by which mail is carried from one part of the building to another. Clerks remain at their stations, saving 90 per cent of the time spent in walking about under the old system.

Education.— The public school system is maintained by a tax of 60 cents on the $100 valuation as shown by the municipal assessment, by an apportionment from the State school fund and by income from property owned by the board of education. Income from all sources for the year ending 30 June 1915 was $4,709,494.43. The income is increasing at the rate of about $100,000 yearly. By the State constitution the school tax rate is limited to six mills on the dollar. The board of education is composed of 12 members who are elected at large by the entire city, four members retiring every two years. The body is independent of the municipal government, having a separate charter and being authorized to levy taxes within the limit and to expend the revenue for school purposes. To preserve a non-partisan or bipartisan character, the two principal parties have for several years divided equally the nominations for the board. There are six high schools, one of which is for negroes. The enrolment for 1916 was 8,253 in high schools and 80,474 in elementary schools. A notable development has been the increase in high school attendance. In 1900 the high school enrolment was 25 to every 1,000 pupils in the schools. In 1916 it was 86 to every 1,000. Another notable fact is that while the number of children of school age increased from 1900 to 1915 only 9 per cent, the attendance increased 37 per cent. Among the departments of school work added in recent years are a teachers' college for training, special schools for individual instruction of defectives, open air schools for children with tuberculosis tendency, extra hours in high schools, an educational museum, a department to enforce attendance, a department of hygiene, summer term schools. The salary schedule has been increased $550,000 annually. The total assets of the board of education amounted to $17,848,198 in 1915. They include 234 school buildings, several of them costing $500,000 each. The public school buildings are used for evening meetings of civic bodies, 1,320 of such meetings having been held in the schoolhouses the past year. The announced policy of the board of education is to add new features of school work as rapidly as funds will permit. Among these features are hand work for fourth, fifth and sixth grades; physical training in out-of-program hours; increase in number and scope of evening schools; increase and scope of summer term schools; more shop and laboratory opportunities in high schools; special classes for normal but retarded children; survey of industrial conditions and vocational guidance.

Saint Louis schoolhouses are now built fireproof and with every modern convenience. With each new school provision is made for much more playground space than formerly. Teachers are appointed under a merit system. They maintain a pedagogical society and a teachers' benevolent annuity association, both of large membership. Women after 25 and men after 30 years of teaching may retire and receive an annuity. The annual dues are 1 per cent of the salary.

Higher Education.— Washington University, with a campus of 113 acres adjacent to Forest Park, with 12 granite buildings arranged in quadrangles, received its name from the fact that the charter for it was signed by the governor of Missouri on 22 February, Washington's birthday. The year was 1853. For a short time the institution was called Eliot Seminary, Rev. Dr. William Greenleaf Eliot having been foremost in promoting the organization. The institution has never received national, State or city aid further than that the charter exempted its property from taxation. The active endowment at present is $11,000,000, with about $5,000,000 more, the income from which will come later. All of this endowment was derived from the gifts of individuals and business corporations. It is receiving additions in considerable sums and frequently. The charter provided that the institution management must be non-sectarian and non-political. No professor or tutor is asked his religion or politics before his appointment. Beginning with the college in 1857, the trustees added the law school in 1867, the engineering department in 1870, the school of fine arts in 1879, the school of botany in 1885. In 1915 new buildings for the medical department were completed at a cost of over $1,000,000. This department is conducted in close relationship with Barnes Hospital, buildings, equipment and endowment of which represent more than $1,000,000. The medical school limits its students to 250 and teaches largely through research. The buildings and endowment of the medical school will be an investment of $5,000,000. Four citizens of Saint Louis pledged $500,000 each. The foremost givers to Washington University have been Robert S. Brookings, now president of the board of trustees, and the late Samuel Cupples. Mr. Brookings, the active head of the Cupples Woodenware Company, planned and developed the great transportation asset of Saint Louis known as Cupples Station. Mr. Brookings and Mr. Cupples gave to Washington University this property when it had developed a valuation of several millions of dollars. Washington University encourages the most practical forms of education. It was the pioneer in manual training under the late Dr. Calvin M. Woodward and carried on a manual training school until this kind of instruction was made a feature of the public school system. The university has recently established a school of finance and commerce. It devotes much attention to advanced and graduate courses. Secondary schools of the university are Mary Institute for girls and Smith Academy for boys, each occupying its own building a mile or more from the university.

Saint Louis University, conducted by the Jesuits, occupies a large group of buildings on Grand avenue. It has a library of 40,000 volumes, many of them rare and old, including the Christian Fathers, in Latin; first editions of Luther; the Bible in 21 languages; "Records of the English Government," beginning with "Doomsday Book" and ending with George IV. The university, in addition to classical and scientific departments, has law and medical schools and a school of finance and commerce. The will of the late James Campbell left the entire estate of $10,000,000 to Saint Louis University for the promotion of medical education, subject only to life income interests of the widow and one daughter. The David Ranken, Jr., School of Mechanical Trades, to prepare youth for the skilled trades, is a recent addition to Saint Louis educational institutions. It was founded and endowed by David Ranken, Jr., a bachelor, with an endowment of more than $3,000,000. The College of the Christian Brothers and Forest Park College for girls are largely attended. Saint Louis has several independent medical schools, a college of pharmacy and numerous convent schools and seminaries. About 30,000 pupils attend parochial schools.

Institutions.— A central structure costing $1,500,000, six branches costing $100,000 each, 60 delivery stations, with collections sent out to schools, clubs and various associations, keep the 400,000 books of the Saint Louis Public Library in circulation. Mr. Carnegie contributed $1,000,000. The city gave as much more and voted an annual tax for support. The new central library building is a fine study in architecture. It has an impressive marble entrance hall, a great marble delivery chamber, which is considered one of the most beautiful rooms in the country, an art room with a ceiling inspired by a Florentine church. The ceiling of the long reading-room was copied from the Laurentian Library in Florence. The reference and open-shelf rooms have ceilings of painted beams, after the style of old French chateaux. The City Art Museum is said to be the only municipal art museum maintained entirely from public funds. It occupies a fireproof building erected at a cost approximately of $1,000,000 by the Louisiana Purchase Exposition Company. The central nave into which the main entrance opens contains a collection of American sculpture said to be the largest and most representative in existence. The exposition company devoted $450,000 to the sculpture for the World's Fair, distributing the commissions among 150 American sculptors. At the close of the fair the best of the works were installed permanently in the museum. 'The Puritan' by St. Gaudens, 'The Sculptor' by French, 'Lincoln' by Weinmann, are in the collection. Four galleries are filled with casts from the antique. Other collections are widely varied, including porcelains by Doat, bronze reproductions from Naples, Greek vases of about 470 B.C. The large picture galleries are occupied by paintings. Two long galleries are given to prints. The annual tax yields a sufficient sum to maintain the museum and to permit of notable acquisitions yearly. The estimated value of the collections is $1,500,000. The attendance is 200,000 annually. Jefferson Memorial, built by the Louisiana Purchase Exposition Company at a cost of $493,000, and dedicated 30 April 1913, is in Forest Park, marking what was the main entrance to the World's Fair of 1904. In the rotunda are Bitter's heroic marble statue of Thomas Jefferson and Bitter's lifesize bronze group of the 'Signing of the Treaty,' by Marbois, Livingston and Monroe, for the acquisition of Louisiana Territory by the United States. The wings of the memorial are occupied by the Missouri Historical Society and by the Louisiana Purchase Historical Association. The collections embrace 30,000 archæological specimens, an historical library of 25,000 volumes, continuous newspaper files of more than a century, battle flags, genealogical records, a municipal exhibit, literature of the World's Fair and a great number of historical manuscripts relating to the 13 States created out of the Louisiana Territory. The rotunda is 60 feet in diameter, fronted with six massive columns. The building is 330 feet in length. The collections are open to the public. The institution is maintained by annual dues of members and by an endowment.

Mercantile Library, sustained by dues of members and by endowment, has 150,000 volumes. It is especially rich in historical literature pertaining to the West. It occupies a building of its own in the business centre. A large reading-room is supplied with 600 periodicals. The halls contain many paintings and statues.

Churches, Benevolent Institutions.—A distinguishing feature of the population is the large number of the descendants of the early French settlers. Families of 10 to 15 children were not unusual in the colonial periods. A genealogical chart brought down to recent date gave the names of more than 900 descendants of Mme.

Marie Thérèsa Chouteau, the first woman resident of Saint Louis, coming in the spring of 1764. Descendants of Madame Chouteau in the present generation married descendants of six nationalities. The devotion of the original Saint Louis stock to the Catholic Church has given Saint Louis a strong religious character. There are 380 churches, of which 80 are Catholic and the rest of almost all Christian denominations. Churches and other buildings devoted to religious purposes aggregate in value $10,000,000, and include some fine structures, notable among which are the old Walnut Street Cathedral, dating from the French occupation of Saint Louis, and the Gothic interior of the church of Saints Peter and Paul, founded in 1848, the oldest German Catholic church in the city. For the maintenance of churches the people contribute $1,000,000 annually, and nearly as much to benevolent institutions.

Botanical Garden and Parks.— Henry Shaw, an Englishman and a bachelor, came to Saint Louis in 1819 and opened a hardware store. In 30 years he accumulated a fortune. He retired from business and established in 1858 what is now the most complete botanical garden in America. The tract, farm land when Mr. Shaw bought it, is now within a well-built section of the city. Mr. Shaw traveled extensively before selecting the location for the "Missouri Botanical Garden," as he named it. He chose Saint Louis because, he said, climate and soil here encouraged the greatest variety of plant life. In the 120 acres of "Shaw's Garden," as it is popularly known, are assembled 15,000 varieties of plants from all parts of the world. Two new conservatories and a new palm house have been added recently to the already large collection of buildings. Orchids, one of the finest collections in existence, more than 1,000 varieties, are displayed in a special house. Another building is devoted to insectivorous plants. A medicinal garden, the herbaceous tract, the North American tract, the arboretum, the water garden, a collection of 1,000 varieties of cacti, a rose garden with 500 selected varieties — these are some of the divisions of the garden. Monthly displays of flowering plants are made in two large conservatories. The garden is open to the public. On Saturdays visitors in groups are personally conducted. Ownership is vested in a board of trustees which administers income-bearing property valued at $4,000,000. The net income maintains the garden and also the Henry Shaw School of Botany, a department of Washington University. The botanical library contains 18,550 volumes, 22,608 pamphlets, 66 manuscript volumes. In the herbarium are 400,000 sheets of specimens.

In addition to the garden, Henry Shaw gave Tower Grove Park of 266 acres adjacent and highly improved, the condition being that the city appropriate annually $25,000 toward the maintenance. The park contains three fine bronze statues given by Mr. Shaw — Shakespeare, Humboldt and Columbus, executed by Mueller of Munich.

Forest is the largest of 53 parks, playgrounds and other reservations for recreation purposes. It contains 1,380 acres. The entire park acreage is 2,766. Installation of golf courses, tennis courts, soccer fields and swimming pools is of comparatively recent date, but is on a scale befitting the population. Fairground, a park of 128 acres, has the largest open-air swimming pool in the country, holding 4,000,000 gallons of water. Natural amphitheatres in Forest Park have been used successfully for open-air dramatic performances. The daily attendance upon the Pageant and Masque in 1914 was 100,000. In 1916 'As You Like It' was given to audiences of 10,000. The statuary in the parks includes Saint Louis (equestrian), Laclede, Washington, Benton, Blair, Bates, Grant and Sigel. Jefferson Barracks, at the southern limits of Saint Louis, is one of the largest military reservations in the country. It is one of the four principal recruiting stations. The buildings represent an expenditure of $1,000,000. A part of the reservation is used for a national cemetery, with 12,000 headstones.

Municipal Government.— The constitution of Missouri, adopted in 1875, conferred upon the city of Saint Louis the power to frame its own charter and at the same time to separate from Saint Louis County. Accordingly a new charter was adopted for the city in 1876. The scheme of a separation was carried. The effect was to establish city boundaries not subject to the usual method of change as the city population grew. The boundaries of the city remain as they were determined by the charter 40 years ago. Several municipalities — Maplewood, Webster, Kirkwood, Clayton, University City — have been formed adjacent to the western limits of Saint Louis. They cannot be brought into the city without their consent and the consent of Saint Louis County. Movements to extend the limits of the city to include thickly-settled portions of the county have not progressed satisfactorily. The effect upon the city's growth in population has already become quite apparent. Street car service, telephone service and some other utilities have crossed the county line without increase of rates. Many thousands of people do business in Saint Louis but live beyond the city limits and are not included in the city's population. The charter adopted in 1876 was continued, with a few amendments, until 1914, when, 30 June, a new charter on modern lines, making radical changes in the forms of municipal government was adopted. The number of elective offices was reduced materially. The mayor now appoints the assessor, treasurer, commissioner of supplies, register, city counsellor, marshal, City Court judges and clerks. For the bicameral legislative department has been substituted a board of aldermen, consisting of a president and 28 members, one for each ward. These aldermen must be residents of their respective wards but are elected by the general vote of the city until such time as the constitution of the State shall permit each ward to elect its alderman. The board of aldermen performs legislative duties only. Such administrative measures as were formerly within the scope of the municipal assembly are now at the disposition of a board of public service. The board of public service, likewise appointed by the mayor at the beginning of his four years' term, is composed of a president and four directors of departments. The departments are public utilities, streets and sewers, public welfare and public safety. A merit system requires the examination of candidates for appointive positions of subordinate classes. An efficiency board, created by the new charter, conducts the examinations and maintains eligible lists from which the three highest candidates are certified to the appointing officers as vacancies are to be filled. The budget system has been introduced under the charter. A board of apportionment, composed of the mayor, the comptroller and the president of the board of aldermen, controls expenditures. The board of aldermen can reduce or cut out items in appropriation bills but cannot increase or insert. The charter confers the right of municipal ownership of public utilities of any kind. This was forbidden under the old charter.

Initiative, referendum and recall are provided. Five per cent of the registered voters for a general election and 7 per cent for a special election have the power to submit to vote the initiated ordinances. Two per cent of the registered voters can prevent an ordinance, except an emergency measure, from going into effect at the 30-days' limit. Forty days more are allowed for the petition by 5 per cent, additional to the 2 per cent, of the registered voters, to compel submission of the suspended ordinance at the next general election; or 10 per cent of the registered voters can compel the submission of the referendum to a special election. After the filing of the petition by 5 per cent or 10 per cent of the voters the board of aldermen is given opportunity to reconsider and repeal the ordinance. If this is not done the ordinance goes to referendum vote.

Any elective officer may be recalled. The petition for the submission of the recall to the voters must be signed by 20 per cent of the registered voters, and these signers must include 20 per cent of the registered voters in each of at least two-thirds of the 28 wards. No recall petition can be filed within the first six months or the last six months of an official term. A successor cannot be elected at the same election that passes upon a recall.

The charter established a complaint board, whose duty it is to investigate the complaint of any citizen about the conduct of any branch of the municipal government or of any public service corporation. The powers conferred by the charter are along modern lines and are extensive, restricted only by the State constitution. The State retains control of three departments: the board of police commissioners, the excise commissioner and the election commissioner, all of whom are appointed by the governor.

Municipal Finances.— The municipal revenue for the fiscal year of 1915, not including receipts from water rates and interest and sinking fund taxation, was $11,073,142.80. The revenue has doubled in 15 years. The tax rate for State, city and schools in 1916 was $2.35 on the $100 assessed valuation. The division of the rate was .18 for the State; .60 for the schools; .04 for the public library; .02 for the city art museum; $1.15 for municipal purposes; .36 for interest and sinking fund. The assessed valuation by the city for the taxes of 1916 was: Real estate, $496,344,000; personalty, $98,048,520. The State board of equalization, which assesses railroad, bridge, telegraph, express and street railway property, added $36,069,769, making the total assessment for Saint Louis $630,452,289. The basis of assessment is two-thirds of actual valuation. The annual increase in the assessment is about $20,000,000. The bonded debt in 1916 was $23,443,000, with $2,791,276 in the sinking fund. This was a smaller debt than the city had 40 years ago. New issues of bonds have been put out from time to time but the debt has been reduced more than it has been increased, notwithstanding growth of population. The present debt of Saint Louis is $16,000,000 below the limit of indebtedness permitted by the State constitution.

Waterworks.— The valuation placed upon the waterworks of Saint Louis is $31,000,000, about two-thirds for the plant and one-third for the distributing system. The water is conducted from two intake towers in the channel of the Mississippi, at the extreme northern limits of the city, and a few miles below the mouth of the Missouri River. Three rivers supply the water,— the Missouri, the Mississippi and the Illinois, the proportions varying widely as the stages of the three rivers change. The waters of the Missouri and the Mississippi are of such different character that they do not unite in the few miles between the mouth of the Missouri and the Chain of Rocks, the location of the waterworks, but flow side by side. The intake tower nearest the Missouri shore receives almost exclusively the Missouri River flow. The city's supply is drawn largely from this tower, except when low stages of the river make it necessary to depend upon the more distant intake which is in a deeper part of the channel.

Decided preference is given to the Missouri River water for two reasons: The Missouri water, although more heavily loaded with silt and less attractive in appearance, yields more readily to the purifying treatment. More important is the fact that there are no large cities on the Missouri for 250 miles above its mouth and there is less contamination from sewage than in the water from the upper Mississippi and the Illinois.

The water let in through the gates of the intake towers flows by gravity through tunnels 60 feet below the ground to the pumps. It is received in wells from which it is lifted by the pumps to settling reservoirs. Between the tunnels and the reservoirs the water during its agitation from the pumps receives the treatment with lime and sulphate of iron, both in liquid form. The liquefaction takes place in the coagulant house. The two streams from the coagulant house are thoroughly mixed with the water. The chemical result is sedimentation so rapid and comprehensive that it cannot be appreciated unless seen in operation. By the time the water has passed through the grit chamber and into the first reservoir coagulation has taken place to such a degree that more than 90 per cent of the mud and solid matter is carried to the bottom.

The city tried settling reservoirs for many years with only partial relief from the muddy water. Filters were in quite general use in Saint Louis homes. The solution of the water purification problem was discovered in March 1904, after long experimentation. At first the methods of applying the lime and iron were crude but they produced such gratifying results that the city developed the process with liberal expenditures now amounting to several millions of dollars. In 1915 the process was further improved by the installation of a mixing cham-

ber and grit chamber before the water reaches the first reservoir. In this grit chamber 29 per cent of the solids drop to the bottom.

The iron and lime are reduced to liquid forms with elaborate automatic machinery in the coagulant house. The proportions of lime and iron vary from hour to hour, as determined by laboratory tests of the "raw" water. The application of the streams of milk of lime and of iron was tried out at several stages of the passage from the intakes to the reservoir before the best results were found. The mud taken out of the water used by the city in 1915 amounted to 358,000 tons, as stated by the water commissioner. In the purification process of that year 13,660 tons of lime and 6,770 tons of sulphate of iron were used. But the cost of purification is insignificant when the benefits are considered. The cost of purification in 1915 was only $4.56 per 1,000,000 gallons, or $424 per day for the entire supply. In earlier years there was some complaint of "causticity," as the result of the use of lime. It is claimed officially now that the coagulation not only takes out of the water all of the lime artificially added for purification but reduces the amount of lime held in solution by the "raw" water.

In 1915 a filter plant, said to be the largest in the world, was added at a cost of $1,357,000. This plant receives the water after it has undergone the purifying process with the lime and iron. In the passage of the water from the reservoirs through the filter to the supply conduit of the city, chlorine and sulphate of alumina are added. The chlorine is introduced just before filtration and the alumina just after. In the first year's operation of the filter plant the 29,823,000,000 gallons of water received 1,225 tons of sulphate of alumina and 57,781 pounds of chlorine. The turbid water is rendered reasonably clear of solids by the lime and iron process. Filtration afterward with the application of chlorine and alumina constitutes a "polishing" process which further improves the color and healthfulness of the water. The revenue from water rates in 1915 was $2,844,837. This revenue can be devoted only to waterworks operation and to the interest and sinking fund for waterworks bonds. The present average daily consumption of water by Saint Louis is 99,000,000 gallons. At the rate of increase in consumption the maximum capacity, which is 150,000,000 gallons per day, will be reached in 10 years. Plans have been drawn for the location of new waterworks on the Missouri River about 20 miles above the mouth, the water to be pumped to one of the highest elevations in Saint Louis County and distributed from a great storage reservoir by gravity conduits to the western part of the city. The intimate relation of the water supply to health has been impressed strongly upon Saint Louis. For a quarter of a century, previous to 1894, water was taken from the river at Bissell's Point, in the upper part of the city, just below the mouth of a large creek which received suburban drainage. The year that the source of supply was changed from Bissell's Point to Chain of Rocks, the present location several miles up the river, the general death rate dropped from 1,935 to 1,700 per 100,000 population. The typhoid death rate was cut from 47 to 23 in 100,000 population. But in 1900 Chicago began sending sewage in full volume down the drainage canal into the Illinois River. That year the typhoid death rate of Saint Louis began to climb again. It increased to nearly 50 in 100,000 population. The first year of the lime and iron treatment the typhoid rate went down. It dropped to 20 in two years. Since 1906 it has been below 20. With the opening of the filter plant in 1915 a further decline to 10 deaths from typhoid in 100,000 was noted.

Decline of the general death rate has been almost as significant as that of typhoid. The death rate for all diseases was from 1,600 to 1,700 under the influence of the Chicago sewage. It dropped to 1,500 per 100,000 population, and then to 1,400, with the purification process. During 1915, the first year of combined clarification and filtration, the general death rate was below 1,300 per 100,000 population. For several years after the Civil War the water supply was drawn from the foot of Bates street, a mile above the business centre, but below a large residence section. Typhoid epidemics were frequent. The general death rate was as high as 2,300 in some years, nearly twice what it is at present. The waste of lives in Saint Louis from contaminated water during 60 years past has been estimated at 92,706.

History.— "The First Thirty," as the original builders of Saint Louis were called, arrived at the foot of what is now Walnut street the night of 14 Feb. 1764. That night they slept on the large flatbottomed boat which they had poled and dragged along the ice-bound bank of the Mississippi 60 miles from Fort de Chartres. Where the 30 landed was a strip of sandy beach rising gently to the base of a limestone cliff from 35 to 50 feet in height. Through this cliff the water from springs and rains and snows had, in the years, worn a gully. On the morning of the 15th, Auguste Chouteau, a sturdy lad of 13, led the party up the gully to a plateau heavily wooded. He pointed to some recently marked trees. There, on a site now bounded by Main and Second, Walnut and Market streets, was begun the building of Saint Louis. The first structures were the headquarters and warehouses for the fur company of Maxent and Laclede. Maxent was a New Orleans merchant. Pierre Laclede Liguest, the founder of Saint Louis, was the younger son in the ruling family of Bedous, province of Béarn, on the French side of the Pyrennees. He received a military education and came to Louisiana to grow up with the country. Maxent and Laclede were officers in a colonial regiment raised to defend the French settlements from the Indians under British influence in the Seven Years' War. At the close of hostilities Maxent and Laclede were given, by the governor-general at New Orleans, an exclusive grant to trade with the Indians in the Missouri River country. An expedition was outfitted, Laclede investing the Liguest property inherited from his mother and taking command. Leaving New Orleans in August 1763, Laclede reached Fort de Chartres in December. There he learned that France had ceded the territory east of the Mississippi to England and that the fort was about to be evacuated by the French garrison. Storing his goods and taking his stepson, Auguste Chouteau, as a companion, Laclede began an examination of the west side of the river northward to the mouth of the Missouri. He selected the present site of Saint Louis, marked some trees to guide young Chouteau, and went back to Fort de Chartres. Ignoring the discouraging advice of the French officers, Laclede told them he had "found a situation where he was going to form a settlement which might become one of the finest cities of America." (Une situation ou il allait former un establissement qui pourait par la suite devenir une des plus belles villes de l'Amérique — Auguste Chouteau's Diary).

Laclede drew the plan of the settlement, organized "The First Thirty," gave Auguste Chouteau command and started the boat, as soon as ice in the river permitted, to begin the building of Saint Louis. Laclede went among the French habitants on the east side, advising them not to go down the river with the garrison but to move to his settlement. Within a few months Laclede was notified from New Orleans that his exclusive grant had been rejected by the French government. Then came more bad news that the king of France had transferred the country west of the Mississippi to his "dear cousin" the king of Spain. Notwithstanding the loss of the grant and the change of sovereignty, Laclede's settlement prospered and became permanent. The remnant of the garrison at Fort de Chartres, headed by Saint Ange de Bellerive, as soon as the English troops arrived, marched to Saint Louis. Government was established with Laclede's house as the capital. Blocks and half blocks and quarter blocks of ground were assigned to permanent residents pending the arrival of the Spanish officials. In five years Saint Louis had secured practical monopoly of the Indian trade not only west but east of the Mississippi and as far north as the Great Lakes and was doing business with 28 Indian nations in open competition. The Spanish governor-general at New Orleans sent an expedition to found a rival settlement at the mouth of the Missouri but it came to nothing. Other attempts to overshadow Laclede's settlement failed. Around Laclede's house centred the development. During the 100 years from 1764 to 1864 the business district of Saint Louis was where Laclede's map had located it in the beginning. The Chamber of Commerce was across the street from the original site of Laclede's house and warehouses. In 150 years the business centre of Saint Louis has not moved a rifleshot from where the vision of this born engineer saw it should be.

Saint Louis remained under Spanish dominion until 9 March 1804, when the United States government sent Captain Stoddard to receive the transfer of Upper Louisiana from the Spanish governor, Delassus. The population of Saint Louis and immediate vicinity was about 1,000 at that time. A territorial form of government was established with Saint Louis as the capital of the territory. Previous to the transfer, the few Americans who had migrated to the west side of the river had passed Saint Louis and had formed settlements beyond. With the establishment of United States authority at Saint Louis, the influx of Americans from the east side became rapid. In 1808 the first newspaper, the *Missouri Gazette*, was established in Saint Louis. Publication, but under a different name, has been continuous from that time to the present day. In 1809 Saint Louis was incorporated as a town, the French habitants still being in the majority.

Growth and Crises.— Saint Louis was incorporated as a city in April 1823. The charter was not adopted without opposition. Property qualification restricted suffrage to those who paid taxes. Of 197 votes cast 90 were against the charter. In the election of mayor the line was drawn between the Americans who had come after the transfer of sovereignty to the United States and the settlers under Colonial government. A Pennsylvanian, William Carr Lane, was elected mayor over two candidates of the old régime by a majority of 24. Seven years after incorporation, the census of 1830 gave 4,977 residents. Saint Louis then ranked 44th among American cities. Ten years later, in 1840, it held the 20th place. In 1880 Saint Louis had passed 38 other American cities and had been passed by only one, Chicago. With the union of New York and Brooklyn, Saint Louis became the fourth city. It has held that rank more than two decades. In attaining the present position in population, Saint Louis has passed through three very serious crises. In the period between 1840 and 1850 a single fire destroyed 23 steamboats at the levee, and swept 15 business blocks in the commercial centre of the city, at a loss of $3,000,000. In that same decade the greatest Mississippi flood of record covered the fertile lowlands to the Illinois bluffs from the mouth of the Missouri to the mouth of the Ohio. Within the period mentioned an epidemic of cholera caused 4,317 deaths. Notwithstanding these drawbacks the population of Saint Louis increased from 16,460 in 1840 to 77,860 in 1850. The European revolution of 1848 and the Irish famine prompted abnormal immigration of which Saint Louis was a large beneficiary. The second of the great crises in the city's history was the Civil War. Previous to 1861 the main traffic routes were between the North and the South. The rivers of the Mississippi Valley gave commercial advantage. Saint Louis was the toll gate of water transportation. The city remained steadfastly loyal to the Union. Chaos succeeded the city's former intimate and profitable business relations with the lower part of the Mississippi Valley. With the return of peace came radical realignment. The main traffic arteries were now east and west. Dominant influences favored the northern routes across the continent. The prestige of Saint Louis suffered.

The third crisis, almost vital it might be said, followed logically the second. Saint Louis had grown rich and mighty on development of water transportation lines. In the decades between 1870 and 1890 rails superseded rivers. The millions of Saint Louis capital invested in boats and navigation disappeared with the decadence of river traffic. Saint Louis was forced to meet the new conditions and did so, but at heavy cost in what had been chief natural advantages.

Population.— The census of 1910 gave Saint Louis 687,029 people. By 1920, the population had grown to 772,897, an increase of 12.5 per cent. over the 1910 figures. Previous to the Civil War the foreign population was proportionally much larger than it is now. In 1910 the foreign-born population was 125,706. About one-third of the foreign-born,

47,765, was German. Russia came next with 15,480; Ireland, third with 14,268; Austria, fourth with 11,171. Other nationalities were inconsiderable. The negro population of Saint Louis was 43,960, a comparatively small increase since the days of slavery abolished by a State constitutional convention in 1865.

Bibliography.—'Auguste Chouteau's Diary'; Douglas, 'The Spanish Dominion'; Billion, 'Annals of Saint Louis'; Shepard, 'History of Saint Louis'; Edwards, 'Great West'; Scharff, 'History of Saint Louis City and County'; Hyde, 'Encyclopedia of Saint Louis'; Stevens, 'The Building of Saint Louis'; id., 'Saint Louis, the Fourth City'; id., 'Water Purification at Saint Louis.'

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SAINT LOUIS, Senegal, West Africa, the capital of the colony known to the natives as Timbuktu or N'dar, is on a small low island near the mouth of the Senegal River. The principal buildings are the cathedral, the great mosque, courthouse, barracks and government buildings, bank, chamber of commerce, public library, printing office; and there is an agricultural society. The gardens of the suburbs and the avenues of palms are attractive features of the town. There are large warehouses and an extensive trade in gums, earthnuts, etc. Water is supplied by an aqueduct seven and one-half miles in length. Pop. about 23,500.

SAINT LOUIS UNIVERSITY, The, located at Saint Louis, Mo., and the oldest university in the Louisiana Purchase Territory, was founded by Jesuit missionaries from Maryland; the beginnings were made at Florissant, Mo., in 1823, when a school for the education of the Indians of the Missouri Territory was established at the request of President James Monroe and the Hon. John C. Calhoun, his Secretary of War. This school was transferred to Saint Louis in 1829, and classes were opened there for white students in 1829. In 1832 the institution was chartered as a university by act of the legislature of Mississippi. In 1842 a medical department was added and in 1843 a school of law. The schools of philosophy and divinity were organized in 1857. In 1888, owing to the encroachments of business, the university was moved to its present quarters and the various departments were erected on the new site with the exception of the school of medicine (1903), which is situated one mile distant. The organization of the university now consists of the College, the Academy, the Commercial Department, Military Science, Normal School, School of Philosophy and Science, School of Divinity and School of Medicine. The College offers two courses, the classical, leading to the degree of A.B., and the scientific, leading to the degree of B.S.; the degree of Litt.B. is also now conferred. The School of Philosophy and Science offers two courses, the philosophical, in which the Latin language and the scholastic method are used, and the scientific, including instruction in mechanics, the sciences and mathematics, with laboratory work. The course of divinity extends over a period of four years, leading to the degree of doctor of divinity. The Military Department is under the management of an officer of the United States army and military drill is obligatory on all undergraduate students. Religious instruction in Catholic doctrine forms part of the courses; non-Catholic students, however, are exempt if they so wish.

The buildings are: The College, the Academy, the School of Divinity, the School of Philosophy, the School of Medicine and the Normal School. The library contains 75,000 volumes, including the library for undergraduates; there are also departmental libraries in theology, philosophy, science and medicine. In 1922–23 the university had property valued at $3,000,000; the student enrollment was 3,264, and the faculty numbered 245.

SAINT LUCIA, one of the Windward Islands, British West Indies, lying south of Martinique; area, 233 square miles. The surface is rugged and mountainous, the mountain sides being mostly covered with dense forests; the valleys and lower heights are fertile and well cultivated. The chief products are sugar, cocoa and logwood; coffee and tobacco are also raised and rum is manufactured and exported. The climate is healthful except in certain low, marshy districts. The island was discovered in 1502, colonized by the French in 1563, was claimed by both England and France and until 1803 its possession several times passed from one to the other. In 1803 it capitulated to the British and was definitely ceded to them in 1814. It then became a part of the government of the Windward Islands. In 1901 there were 44 government schools. Castries, the capital of the island, is one of the most important ports and the second British naval station in the West Indies.

SAINT LUCIE GRASS. See GRASSES IN THE UNITED STATES.

SAINT LUKE, Academy of (ACCADEMIA DI SAN LUCA), an academy of fine arts organized some time previous to 1517, when it was officially recognized by a brief of Pope Gregory XIII. Muziano organized it from the old statutes governing the so-called "Universitá delle Belle Arti," which itself had grown out of a mediæval guild of painters. During the pontificate of Sixtus V the new organization was placed under the patronage of Saint Luke and the revenues of Santi Martino e Luca were allocated to it. The academy awarded prizes in painting, sculpture and architecture. It received rich endowments from Zuccari and from Clement XI. Canova advocated a new constitution early in the 19th century, which was granted by Pius VII in 1818. The president is elected annually, there are 36 academicians, architects, painters, sculptors. The academy maintains a school of design in which is given instruction in architecture, painting and sculpture. The academy is housed in Via Bonella, where it maintains priceless collections. It now receives an income of $7,000 from state funds. Consult Armand, 'L'Académie de Saint Luc à Rome' (Rome 1866).

SAINT LUKE, Guilds of, were associations of painters organized in mediæval times under the patronage of Saint Luke. The guilds flourished for many years in Holland and admitted as members engravers, printers and other artists.

SAINT MALO, săn mă-lō, France, in the department of Ille-et-Vilaine, at the mouth of the Rance, on the English Channel, occupies a rocky island, 43 miles northwest of Rennes. It communicates with the mainland by a causeway called Le Sillon. The harbor affords a total quayage of more than two miles. The principal buildings are the custom-house, chamber of commerce, the parish house of the 15th century, school of hydrography, the Hôtel-de-Ville, with a museum and library, the Casino and statue of Chateaubriand before it, and the ancient castle. The manufactures are hosiery, nets, sailcloth, cordage. It is an important seaport and shipbuilding is one of the chief industries. There is trade in corn, fruit, wine and provisions, chiefly with England and the Channel Islands. Pop. about 12,000.

SAINT MARC, Fr. săn märk, Haiti, town on Saint Marc's Bay, on the west coast, 44 miles northwest of Port-au-Prince. Near the town is a headland known as Crête a Pierrot, which was strongly fortified by English engineers and occupied by native soldiers in the war of independence, who here made a strong resistance against the French. It is the shipping port for a fertile valley and exports chiefly coffee and logwood; the town also contains several distilleries. Pop. 20,000.

SAINT-MARC-GIRARDIN, săn märk zhē-rär-dăn, **François Auguste,** French statesman and author: b. Paris, 12 Feb. 1801; d. 11 April 1873. He was educated at the Collège Napoléon and at the Collège Henri IV, and in 1834 occupied the chair of poetry at the Sorbonne, having exchanged it for that of history, held for a short time previously. His political life began also at this time as a member of the Chamber of Deputies. In 1871 he was elected to the National Assembly and was its vice-president when he died. Among his best-known books are 'Political and Literary Notes on Germany' (1835); 'Essay on Literature and Morals' (1845); 'Course of Dramatic Literature; or, The Use of the Passions in the Drama' (1843–77); 'La Fontaine and the Fabulists' (1867); and 'Jean Jacques Rousseau, His Life and Works' (1875).

SAINT MARK, Column of. See VENICE.

SAINT MARK'S CHURCH (San Marco). See VENICE.

SAINT-MARTIN, săn mär-tăn, **Louis Claude,** French philosopher: b. Amboise, France, 18 Jan. 1743; d. Aurai, near Chatillon, 14 Oct. 1803. He traveled through Germany, England, Switzerland and Italy, making converts to his mystical philosophy, which he had derived from a study of the works of Jacob Böhme. His followers styled themselves "Martinists" and held that man on one side of his nature was a type of the universe, a microcosm; on the other the thought and reflection of God. By introspection all knowledge and wisdom could be reached. Of his works the most important are 'Des erreurs de la verité' (1775); 'De l'esprit des choses' (1800); 'L'homme de desir' (1790). Consult Caro, 'Essai sur la vie et la doctrine de Saint-Martin' (1852); Matter, 'Saint Martin le philosophe inconnu' (1864).

SAINT MARTIN, sānt mär'tĭn (Fr. săn mär-tăn), an island of the Lesser Antilles, lying north of the Leeward Islands and east of Porto Rico; area, 37 square miles. Its surface is hilly, the elevation being highest in the centre of the island. In the southern part are several salt lagoons from which considerable quantities of salt are obtained. Sugar is the chief agricultural product, rum is manufactured and sugar, rum and salt are the chief exports. The island was settled in 1638 by French and Dutch, who were later driven out by the Spaniards. In 1648 they regained possession and divided the island between them, the French taking the northern portion (20 square miles); and the Dutch the southern portion (17 square miles); the French portion is a dependency of Guadeloupe, the Dutch, a dependency of Curaçao. Pop. 7,000.

SAINT MARTIN'S DAY. See MARTIN I, SAINT.

SAINT MARY HALL, originally this was the parsonage-house of the rectors of Saint Mary's Church, Oxford, until it was presented by Edward II in 1326 to Oriel College. It then became a university hall and the office of principal was held by Oriel fellows to 1656, from which time the chancellor exercised right of nomination. In 1902 it was regularly incorporated with Oriel, in which its site, buildings and property are now vested.

SAINT MARYLEBONE, mérl'lē'bŏn, England, a metropolitan borough in the northwest of London and a favorite residential district. Area, 1,473 acres. Regent's Park contains the Zoological Gardens and the Gardens of the Royal Botanical Society. Lord's Cricket Ground, the headquarters of the Marylebone Cricket Club (M.C.C.), Queen's Hall, a favorite concert hall, Madame Tussaud's waxwork and Harley street, mainly occupied by doctors, are all in the borough, which returns two members to Parliament. Pop. 118,160. Consult Clinch, 'Marylebone and Saint Pancras' (1890); Smith, 'Account of the Parish of Saint Marylebone' (1833).

SAINT MARYS, Canada, town and outport in the province of Ontario, on the Thames River, 100 miles southwest of Toronto, on the Grand Trunk and the Canadian Pacific railways. Agricultural implements are manufactured here, and there are saw, grist, oatmeal and flax-mills. Pop. (1921) 3,843.

SAINT MARY'S, Md., the first settlement made in the State. In 1634 Governor Calvert in his ship, the *Ark*, sailed up the Potomac to Saint Mary's River and bought land of the Indians and established a settlement near the mouth of the Saint Mary's. A Jesuit mission was established; many of the settlers, however, were Protestants and absolute liberty of worship prevailed. Though Saint Mary's was the capital of Maryland and for a number of years the only town in the colony, it was never more than a small settlement. In 1694, after Maryland became a royal colony, the capital was moved to Annapolis and Saint Mary's fell into decay.

SAINT MARYS, Ohio, city in Auglaize County, on the Lake Erie and Western, Toledo and Ohio Central and the Western Ohio Traction line, about 25 miles southwest of Lima. It was settled in 1795, by whom is not positively known; but some county historians give the credit to Charles Murry. It was incorporated

in 1820, and became a city under the new code, June 1903. It is in an agricultural region and in the oil belt, but it has large manufacturing interests. The chief manufacturing establishments are chain works, spoke works, woolen mills, machine shops, box factory, straw board works and other smaller factories. The total number employed in all the manufactories is about 1,000. There are eight churches; and the educational institutions are public and parish schools and a business college. The three banks have a combined capital of $180,000; the annual amount of business is $1,200,000. There are two building and loan associations, one daily and two weekly papers. The government is vested in a mayor, council and marshal. The council is composed of four members and three at large, who hold office two years. Pop. 5,679.

SAINT MARYS, Pa., borough in Elk County, 100 miles northeast of Pittsburgh, on the Pennsylvania and the Pittsburgh, Shawmut and Northern railroads. There is a Roman Catholic convent school of the Sisters of Saint Benedict here. In the surrounding district there are deposits of bituminous coal and fire clay, and there is an abundant supply of natural gas. Manufactures include flour, electrical supplies, fireproofing material, sewer pipe and wood alcohol. Pop. 6,967.

SAINT MARYS, a river connecting Lake Superior and Lake Huron. It receives the overflow of Superior and discharges its waters into Huron. A fall of 22 feet in the river at Saulte Sainte Marie was an obstruction to navigation. Two canals have been made; one on the United States side of Saint Marys' Falls, and the other on the Canadian side. The United States canal was opened June 1855. This canal is now one and one-half miles long, 100 feet wide at the bottom, and 20 feet deep. Hay Lake Channel, adjoining Saint Marys River below the falls, has shortened, by 11 miles, the passage from Huron to Superior. Navigation is closed by ice part of the year. The registered tonnage the first year through the United States canal was 106,296, and for 1900, 20,136,782. The canal on the Canadian side was opened in 1895. The total freight traffic of both canals in 1915 was 71,290,304 short tons. The river is spanned by the International Bridge at Saulte Sainte Marie. There are a number of well-wooded islands in the river, all of which are favorite summer resorts. See BOUNDARIES OF THE UNITED STATES.

SAINT MARY'S CHURCH, Cavalry Engagement at. General Sheridan, after his Trevilian raid, arrived at White House, on the Pamunkey, 21 June 1864. On the 22d the depot at White House was broken up, Grant having established a new base at City Point, and a train of 900 wagons set out, under cover of Sheridan, to cross the James River on the pontoon-bridge at Bermuda Hundred. It crossed the Chickahominy at Jones' bridge and moved to Charles City Court House en route past Malvern Hill, in advance of which were Wade Hampton's and Fitzhugh Lee's cavalry divisions which had kept close to Sheridan after the battle of Trevilian Station (q.v.) and were now hanging on his flank. Keeping Torbert's division with the trains, Sheridan sent General Gregg, with his division and two batteries to Saint Mary's Church, to cover the exposed flank, and Gregg intrenched in a strong position. There was some skirmishing during the 24th, and late in the afternoon Hampton and Lee attacked Gregg on the right flank and in front, and after a stubborn contest forced him to give way, in some confusion, Sheridan says, but losing no material. Gregg, however, asserts that though the contest was unequal he retired without confusion or disorder; but he left his dead and wounded on the field. Hampton pursued to within two and one-half miles of Charles City Court House. The trains were moved back to Doutharts' Landing on the James and were ferried over, Sheridan following them across on the 26th. The Union loss as reported was 29 killed, 188 wounded and 122 missing. The loss in Hampton's division was six killed and 59 wounded. Fitzhugh Lee's loss is not reported.

SAINT MARY'S COLLEGE, located at Saint Mary's, Marion County, Ky. It was founded in 1821 by the pastor of the Catholic settlement as Saint Mary's Seminary; in 1833 the Jesuits took exclusive control, and the name was changed to Saint Mary's College; in 1837 the college was legally incorporated. A college farm was conducted, and all students were required to work one day every week on the farm. In 1846 the Jesuits abandoned the control of the college, and in 1847 it was transferred to the charge of the secular clergy of the diocese of Louisville. Financial difficulties resulted in its being closed from 1869 to 1871, and in the latter year it was reopened under the charge of the Fathers of the Congregation of the Resurrection, a teaching order, and was later recognized as the official Roman Catholic college of the diocese of Louisville. The courses are divided among three departments, the commercial or English high school, the academic or classic high school, the classic or collegiate departments; the courses of the first two departments occupy three years, the course of the collegiate department, four years; the degree of A.B. is conferred on graduates of the collegiate department; A.M. is conferred for one year's graduate work. The library numbers over 7,000 volumes, and is being steadily increased; the annual income $30,000; the students average 120, and the faculty 12.

SAINT MARYS FALLS CANALS. See SAULT SAINTE-MARIE CANALS.

SAINT MARY'S SEMINARY, a Roman Catholic theological school in Baltimore, Md.; opened 30 Oct. 1791. From the first the seminary has been in charge of the Society of Saint Sulpice, an organization founded by Father Olier, in 1642, for the purpose of preparing young men for the priesthood. On the site of the present institution, when the Fathers purchased the place, was the well-known "One Mile Tavern." There were only five students in the school during the first three years, and in 1806 only 12 students. The superior-general of the Sulpicians had about decided to withdraw his professors, as they were much needed in other schools; but the entreaties of Bishop Carroll and the advice of Pope Pius VII prevailed, and the school continued its work. For a time Saint Mary's College, Baltimore, now replaced by Loyola College (1852), and Mount Saint Mary's College, Emmitsburg, were affiliated with the seminary. The latter ceased to be a part of Saint Mary's Seminary, Baltimore, in 1826. Saint Mary's Seminary was raised by the Maryland legislature in 1804 to the rank of a university, with power to confer degrees in the different departments of the sciences upon such of the students and clergy as satisfy the examination requirements. A student to obtain admission to the seminary must have a well-formed desire to study for the Roman Catholic priesthood, be recommended by his ecclesiastical superior, and for the first year of philosophy, must have completed a full classical course, and pass a satisfactory examination. Students from other schools may be admitted to such courses as their examinations may entitle them. The main library contains about 50,000 volumes; special libraries are in the departments of theology and philosophy. There are well-equipped reading and study rooms. Particular attention is given to music, especially the Gregorian and Plain Chants. The members of the Association of Saint Camillus, which began in 1894–95 and was organized in 1898, visit hospitals and other institutions. Recently they had on their visiting list 15 institutions. In 1903 a scholarship was founded by Dr. Charles S. Grindall of Baltimore, for the benefit of "a native of the archdiocese of Baltimore studying for the missions of the same archdiocese." Attendance is not limited to any diocese or country. The faculty comprises 22 instructors, the annual average attendance of students is 340.

SAINT MAURICE, Canada, a river in the province of Quebec, flowing into the Saint Lawrence at Three Rivers. Its course of 300 miles is marked by fine scenery, and waterfalls, one of which, 22 miles from its mouth, has a height of 160 feet.

SAINT MICHAEL (formerly REDOUBT SAINT MICHAEL), Alaska, a settlement on Saint Michael's Island, in the southern part of Norton Sound; lat. 63° 28′ N.; long. 162° 5′ W. The settlement, or trading post, was founded in 1833 by Tebenkoff. The island is low and volcanic and is covered with vegetation. Saint Michael is the port where ocean steamers transfer and receive freight which is carried up and down the Yukon. The river vessels pass through the Aphoon Channel, behind a bar, and enter the Yukon by its northern passage. Navigation opens in June and closes in September. After the discovery of gold, Saint Michael became important. During the summer there is a population of between 3,000 and 4,000. Many of the permanent residents are Eskimos. Pop. about 400.

SAINT MICHAEL'S, or SÃO MIGUEL. See AZORES.

SAINT MICHAEL'S COLLEGE, Vermont, a Catholic institution of higher learning at Winooski Park, near Burlington, opened in September 1904, and incorporated 28 Jan. 1913 by act of legislature, with powers to grant the usual college degrees. The buildings stand on high ground overlooking the beautiful valley of the Winooski River, and commanding a fine view of Mount Mansfield to the east, of Lake Champlain and of the Adirondacks to the west. The preparatory or academic department furnishes both classical and commercial courses, the collegiate department a liberal course leading to the degree of bachelor of arts (A.B.). Several scholarships have been established. The faculty numbers 15; the annual attendance of students averages 175. The tuition fees are $50; board and living expenses $200 per annum.

SAINT MICHAEL'S MOUNT, England, in Cornwall, three miles east of Penzance, is an isolated rock of conical form, about 200 feet high. An ancient and picturesque castle stands upon its summit, from whose tower projects the stone lantern called "Michael's Chair." A causeway connects the island with the shore. A fishing village with a projecting harbor nestles at its base. The hill is a geological curiosity, being a vast mass of granite protruding through schistous rocks. In remote times Edward the Confessor founded upon it a Benedictine priory, which at the time of the Conquest was annexed to the abbey of Mount Saint Michel in Normandy. Its possession was disputed during the Lancastrian and Parliamentary wars. After a considerable period it passed from the monks into secular possession, becoming a manorial residence, and in 1660 the property of the Saint Aubyns.

SAINT-MICHEL, săn mē-shĕl, **Mont,** France. See MONT-SAINT-MICHEL.

SAINT MORITZ, or SAINT MAURICE, Switzerland, mountain resort and watering-place in the Upper Engadine, canton of the Grisons, 42 miles east of Geneva. Its altitude is 6,037 feet, the highest of any village in the Engadine. The springs of chalybeate and carbonic acid are about a mile south of the village. The waters were reported by Paracelsus in 1589. Saint Moritz is popular as a year-round pleasure and health resort. The scenery is magnificent. Pop. 1,684.

SAINT NAZAIRE, săn nä-zār, France, a seaport town in the department of Loire-Inférieure, near the mouth of the Loire and 40 miles west of Nantes by rail. Great improvements have been carried out in the port. The town is the terminus of the General Transatlantic Company, and the shipbuilding yards of this company and that of the Loire employ about 2,500 men. Extensive forges employ 1,600 men in the manufacture of steel rails, sheet and bar iron, etc. The town is of recent growth and these industrial works form its chief buildings. Of peculiar interest in the vicinity is an ancient granite dolmen, 10 feet long and five wide, resting horizontally on two stones, which extend about seven feet above the surface of the ground. Saint Nazaire was one of the ports of debarkation of the American Expeditionary Force in 1917–18. It is believed that Saint Nazaire occupies the site of the ancient Corbilo, in whose harbor the Roman fleet was built (56 B.C.). Pop. about 38,000.

SAINT NICOLAS, săn nē-kō-lä, Belgium, in the district of Dendermonde, in East Flanders, 12 miles by rail southwest of Antwerp, occupies a central position in the densely populated region of Waes. The most important buildings are the town-hall and churches. It is an agricultural and manufacturing centre and has a large flax market and manufactures of cotton, wool, lace, needles, bricks and pottery. There is considerable trade in linens, flax, corn, etc. It is celebrated as the place where Philip the Fair about the beginning of the 14th century swore to maintain the privileges of Waesland, of which Saint Nicolas was the capital. Pop. about 32,000.

SAINT OLAF COLLEGE, located at Northfield, Minn. It was founded by the pastor of the Norwegian Lutheran congregation of Goodhue County in 1874; until the year 1886 it had only an academic (secondary) department; from 1886 to 1890 it gradually developed into a college, and in 1890 was officially placed under the control of the United Norwegian Lutheran Church. Though this official connection was severed for a time in 1893, the college continued to be closely affiliated with the denomination, and in 1899 the official relation was re-established. In 1900 the college department of the United Church Seminary was united with Saint Olaf College. The organization of the college includes two departments: the Academic Department and the Collegiate Department. The collegiate department offers two courses, classical and scientific, leading to the degree of A.B. and B.S.; a few electives are offered in the junior and senior years. The academic department has three courses, the classical and scientific, especially designed to prepare students for the corresponding collegiate courses, and the English course; the latter includes instruction in bookkeeping, commercial law and domestic economy. Biblical or church history forms a part of the curriculum in both departments; and there is a musical department providing courses in piano and voice culture. The Steensland Library building was completed in 1902 and contains the museum and a library of 8,000 volumes. The college is coeducational. In 1922–23 there were 928 students and a faculty of 60. The college property is valued at $963,008.

SAINT OMER, săn-tō-mār, France, a fortified city in the department Pas-de-Calais, 26 miles southeast of Calais, on the Aa River. It is situated on a marshy site, has two harbors and begins the canalized portion of the Aa. The Gothic cathedral is old and curious. It has fine portals (13th–14th centuries), good paintings, interesting statues and monuments, wood carvings and fine stained glass and mosaics. The other notable points of interest are the ruined tower and arches of the Benedictine abbey of Saint Bertin and a museum. The church of Saint Sepulchre is remakable for its beautiful stone spire and stained-glass windows. The town-hall contains valuable records, a picture gallery and a theatre. There is a large public library and extensive arsenal. Saint Omer manufactures tobacco pipes, cloth, hosiery, tulle, cambric and muslin embroideries. Its trade is in these articles and in paper, flour, sugar, beer and other liquors. The town has often suffered from attack and invasion by the French, Flemish and Spaniards.

SAINT OUEN, săn-too-ŏn, France, a suburb of Paris, in the department of the Seine, about one mile southwest of Saint Denis, is an important manufacturing centre and river-port, with spacious docks. The industrial establishments include foundries, forges, machine and glass works, sugar and sawmills and manufactories of rubber-goods, varnish, printer's ink, canned foods and firearms. Here in 1814 Louis XVIII promised, over his signature, a constitutional charter to France. Pop. about 42,000.

SAINT OURS, săn-toorz', **Jean Baptiste de,** SIEUR D'ESCHAILLONS, French-Canadian soldier: b. Canada, 1668; d. Montreal, 1747. His father, Pierre de Saint Ours, was the first of the family to come to Canada, and obtained extensive grants of land. The son entered the army at an early age and in 1702 was made lieutenant. He was one of the commanders of the expedition against Fort Orange (Albany) in 1708. He commanded a company in De Ramezay's expedition against the English in 1710, and in 1721 was sent on a special mission to several Indian tribes by the governor, De Vaudreuil. On this expedition Saint Ours endeavored to put a stop to the liquor traffic with the Miamis, and tried to bring about peace between the Sioux and their enemies; also induced the Creeks to form a single village. On his return he subsequently became king's lieutenant of Montreal.

SAINT PANCRAS, England, a metropolitan and Parliamentary borough of London, lying east and north of Regent's Park. Area, 2,694 acres. It is well supplied with open spaces, which include Parliament Hill and Primrose Hill. The great railway terminals of Saint Pancras, King's Cross and Euston Square are within the borough, which has been the pioneer in the metropolis of the municipal supply of electricity. Saint Pancras returns four members to Parliament. Pop. 218,387. Consult Clinch, 'Marylebone and Saint Pancras' (1890); Coull, 'History of Saint Pancras' (1861); Miller, 'Saint Pancras Past and Present' (1874); Palmer, 'Saint Pancras' (1870); Roffe, 'Perambulating Survey of Saint Pancras' (1865).

SAINT PATRICK'S COLLEGE, a theological school in Maynooth, Ireland. It was founded in 1785 and endowed, the only Roman Catholic institution in Ireland which received a government endowment. Several attempts were made to repeal the act granting this aid, and in 1869 the opponents in Parliament were successful. The college received, in lieu of its annual income, a capital sum equal to 14 times its annual endowment. The college is now affiliated with the National University of Ireland. It has a large faculty, well-equipped library, laboratory and study-rooms. There are from 500 to 600 students in attendance each year. A large number of the students, who have been ordained priests, have been sent to all parts of the world, especially to North America, South Africa and Australia; and have filled all ecclesiastical positions from the missionary among savages to that of archbishop.

SAINT PAUL, the Apostle to the Gentiles. According to Acts xxi, 39 Paul was a native of Tarsus, the most important city of Cilicia. His parents were of pure Jewish descent, for he could boast that he was "of the stock of Israel, of the tribe of Benjamin, a Hebrew of the Hebrews" (Phil. iii, 5). His father, however, was a Roman citizen. How he had acquired this privilege we are not told. It may have been purchased or obtained in some other way. Paul was content to say that *he* was freeborn. Tarsus was a centre of Greek culture and the son of a citizen of that town had ample opportunities to secure the best classical education the times afforded. To what extent Paul shared these advantages is not stated, but his words (Acts xxii, 3) appear to mean that at a comparatively early age he was sent to Jerusalem

to receive a *Jewish* rather than a Greek education. The social status of Paul's parents may have been high. There are good reasons for thinking that the family was wealthy. (Consult Ramsay, 'Saint Paul the Traveller,' etc., pp. 310 ff). However, this did not interfere with the good Jewish custom of teaching the boy a trade. That he learned to make tents was the more natural since the wool of the long-haired Cilician goats was extensively used for tent-cloth. It is probable that he learned his handicraft before he went to Jerusalem for his education.

Like other individuals with two names in the New Testament he was more familiarly known in Jewish circles by his Hebrew name, Saul. Paul was his Roman name, the cognomen given him probably by his father, for what reason we do not know. As his life work developed and he felt himself called to minister to the great Gentile world he preferred his Roman-Greek name to the Hebrew one.

The date of Paul's birth cannot be fixed with exactness. In his letter to Philemon (9), written probably about 60 A.D., he calls himself an elderly man (*πρεσβύτης*). This may be taken as signifying, approximately, one who has attained his 60th year. Probably he was born within a very few years of the beginning of the Christian era.

His personal appearance was not imposing. His opponents could easily admit that his letters were powerful and at the same time remark that "his bodily presence was weak and his speech contemptible" (2 Cor. x, 10). A very ancient tradition in Asia Minor speaks of him as "baldheaded, bow-legged, strongly built, a man small in size, with meeting eyebrows, a rather large nose, full of grace, for at times he looked like a man and at times he had the face of an angel." (Consult Ramsey, 'The Church and the Roman Empire,' ch. xvi). Behind such an unattractive exterior lay a physical nature capable of enduring the severest strains (see 2 Cor. xi, 23–28) and a soul endowed with most varied gifts in rich abundance.

To the young Jew of Tarsus the opportunity to study in Jerusalem at the feet of Gamaliel (Acts xxii, 3), one of the most learned rabbis of his day, was a privilege to be used to the utmost, no mere parent-imposed task. Proud of his Pharisaic ancestry and training the young man eagerly pursued his studies "advancing in Judaism beyond many" of his associates, "being more exceedingly zealous for the traditions" (Gal. i, 14). He studied the Old Testament and especially the Law not merely as the authorities for the national religion or for orthodox Pharisaic theology, but as the foundation and source of his personal religion. He was anxious to attain the righteousness demanded by the Law. So far as externals went he succeeded in doing this (Phil. iii, 6). But the more thoroughly he probed his religious experience the more hopeless his case seemed. The sentence of the Law became to his sensitive conscience the sentence of death (Rom. vii, 7–25).

It was while Paul was thus pursuing his studies in the rabbinic schools that Jesus the Messiah lived and died. Whether Paul was in Jerusalem on any of the occasions when Jesus visited the place, or whether he ever saw Jesus in the flesh is doubtful. (2 Cor. v, 16 does not necessarily imply this). However that may have been, Paul's opposition to Christianity did not begin with the first Christian preaching. Not until the early Church had become well started, when such a teacher as Stephen began to declare the merely temporal character of Jewish ordinances, was Paul's opposition aroused. We meet him first in the record of the martyrdom of Stephen at which the witnesses laid down their garments (Acts vii, 58, cf. Deut. xvii, 7) "at the feet of a young man named Saul, who was consenting to his death" (Acts vii, 58, viii, 1). Though too young to have been a member of the Sanhedrin (Acts xxvi, 10 does not mean this) he stood high in the favor of the Jewish authorities and was only too willing to take the lead in a general persecution of all Christians in Palestine and adjacent lands. After having caused the imprisonment of many in and about Jerusalem, some of whom were put to death, while others suffered great indignities (Acts xxvi, 10–11, xxii, 19, ix, 1, Gal. i, 23), he secured authority from the chief priests to proceed to Damascus and take action against any Christians he might find there (Acts ix, 1, xxii, 5, xxvi, 12).

But Paul was not to enter Damascus as a persecutor. As he and his party neared the city a sudden and most profound transformation took place. Paul had a vision, in which he saw Jesus the Nazarene and heard Him ask "Saul, Saul, why persecutest thou me?" (cf. Acts, ch. ix, xxii and xxvi, and also Gal. i, 15, 1 Cor. ix, 1, xv, 8). It was enough. Henceforth Paul's entire point of view was changed. God had "revealed His Son" in him. He had seen Jesus as *Lord*. It meant parting with all his past, though as yet he saw this only as to some main points. Above all, it revolutionized his idea of Jesus. That one had been to him only the justly crucified leader of a heretical movement. He was now and evermore the glorified Messiah. Accepted as a brother by the believers in Damascus, Paul soon began to proclaim Jesus as the Messiah to the Jews there. This only aroused their hostility and they plotted to get him in their possession. He succeeded in escaping (Acts ix, 25, 2 Cor. xi, 32) and made his way into Arabia (Gal. i, 17) where he stayed for upward of three years, not "conversing with flesh and blood," that is, not seeking light or instruction from those who had been Christians before him, but in meditation and communion with God, seeking to sound the depths of that great revelation that had been granted him. What struggles and conflicts he then went through, what changes of view on many details of his Jewish belief, what great revolutions of opinion, what new-found hopes and convictions he now experienced — we can see all these reflected in his later speeches and letters. Finally he was able to outline the main points involved in his new faith. That Jesus of Nazareth was and is the Son of God, that in His death forgiveness of sin is made possible, and that through faith in Him forgiveness and salvation are made a personal possession,— these formed the core of his gospel of the cross, a gospel that no man taught him, but which came to him from God (Gal. i, 11).

He was now ready to learn details about Jesus' earthly life and ministry. He, therefore, returned to Damascus and then visited Jerusalem especially to talk with Peter. Having gained what he desired from Peter and by his

preaching having aroused the opposition of his former associates in Judaism, he soon left Jerusalem and went into «Syria and Cilicia» (Gal. i, 21; cf. Acts ix, 30). After some years' labor in these regions, he was sought out by Barnabas and persuaded to join that good man in the work of building up the new church at Antioch, the metropolis of Syria. This church had almost from the first considered Gentiles as worthy to be approached directly with the Gospel message. In such an atmosphere Paul's own view of the Gospel as suited for man as man independent of his antecedents found room for full expression. After laboring here for a year Paul, with Barnabas, was delegated to carry an offering from the church at Antioch to the mother church at Jerusalem (Acts xi, 27–30, xii, 25). Since Paul makes no mention of this visit in his survey of his connection with the mother church in Galatians i and ii, it is probable that it was of no special importance to Paul personally. Returning to Antioch accompanied by John Mark of Jerusalem, Barnabas' cousin, it was soon decided to organize a mission to the adjacent lands. At a meeting of the church Barnabas and Paul were formally set apart to this work through prayer and laying on of hands (Acts xiii, 1–3).

Taking with them John Mark as assistant, the two set out on the First Missionary Journey (Acts xiii, 4–xiv, 28). Cyprus was first visited and traversed from end to end, then crossing the sea to the mainland they disembarked at Perga of Pamphylia. Here they decided to strike inland. For some reason Mark deserted them now and returned to Jerusalem. From Perga they proceeded to Antioch of Pisidia. At this important centre of trade the missionaries stopped. Paul delivered an address in the Jewish synagogue, in which he sought to convince them that Jesus was indeed the Messiah promised in the Scriptures. So great was the interest aroused that a second address was asked for the following Sabbath. At this meeting the majority in the synagogue refused to accept the message and the missionaries then turned their attention to the Gentiles. A Christian Church was soon organized in which naturally Gentiles and Jews met on equal terms. The work grew rapidly but the opposition of the Jews of the synagogue became so bitter that Paul and Barnabas thought it best to leave. From Antioch they proceeded eastward to Iconium, where they met with much the same experience. From Iconium they went on to Lystra and thence to Derbe. At Lystra, the home of the future disciple, Timothy, the healing of a cripple led the pagan multitude to think that the gods were again visiting the earth. All these towns were on a great commercial highway leading through southern Asia Minor from Asia to Europe and, though originally belonging to different nations, were then all included in the great province of Galatia. Consequently the churches founded on this journey may be those to whom the apostle addressed the Epistle to the Galatians (q.v.). From Derbe the missionaries retraced their steps and arriving at the coast sailed directly to Antioch without revisiting Cyprus. The journey, which probably covered about a year and a half, had been a complete success. It proved how the Gospel was capable of being applied to and understood by the pagan world.

Just at this time extremely conservative Jewish Christians from Jerusalem disturbed the peace of the Antioch Church by teaching, as the orthodox view, that Gentiles, in order to be saved, must not only profess faith in Jesus Christ and be baptized, but also be circumcised and obligate themselves to keep the Jewish law. What part Paul took in the discussion at Antioch we do not know, but so serious was the situation seen to be that the church decided to refer the matter to the apostolic body at Jerusalem and delegated Barnabas and Paul to represent them at the council so summoned.

The probable date of the Apostolic Council was 49 A.D. or possibly 48. If Paul counts the «fourteen years» of Gal. ii, 1 from his conversion, then that event took place somewhere near 35 A.D. If the 14 years is to be counted from his visit to Jerusalem to see Peter (Gal. i, 18) then his conversion must have been as early as about 32–33 A.D. The report of the council in Acts xv needs to be supplemented by Paul's own statements in Gal. ii, 1–10. The result was a victory for Paul, at least to this extent, that the mother church put itself on record as recognizing the legitimacy of the Gentile Christian movement and refused to order that Gentile Christians should be circumcised. To Paul himself was given full recognition of his Apostolic status.

Soon after their return to Antioch, Paul proposed to Barnabas that they revisit their churches in Galatia. Barnabas wished to take Mark. Paul would not consent to this since Mark had deserted them on the first journey. The contention was sharp and the two friends separated. Paul now set out with Silas (Silvanus) as his companion on his Second Missionary Journey (Acts xv, 40-xviii, 22, 49–51 A.D.). Entering Asia Minor through the Cilician gates, in due time they arrived at Derbe and Lystra. Here they were joined by Timothy, a choice young convert. After spending some time with the churches organized on the first journey, they moved on through Asia Minor, perhaps founding some new churches in Galatia (see GALATIANS, EPISTLE TO), and finally arrived at Troas, where, possibly, Paul met Luke. The «we» sections of Acts begin at this point (Acts xvi, 10). Here the night vision of a Macedonian man calling for help convinced Paul that the Gospel must be carried into Europe. Crossing over to Macedonia, at Philippi, at Thessalonica and at Berœa, all Macedonian towns, Paul succeeded in organizing churches. His method was essentially the same in all cases,— first to address the Jewish inhabitants at their synagogue or other meetings, and then, when hostility manifested itself, to withdraw his adherents from the synagogue and organize a church of the free Gentile Christian order. The discontented Jewish element followed him with dangerous persecution and it was to avoid falling into their hands that he left Berœa hastily and went on to Athens. Here apparently was an uninviting field. The city of philosophers and idlers was not thirsting for the Gospel of Paul. But in spite of misgivings he delivered his famous address on Mars Hill. Perhaps nowhere does Paul's versatility and breadth of view, his profound conception of the universal character of the Gospel message show itself as it does here in this address. But Athens was not prepared for such a message and as soon as his helpers arrived from Macedonia with the report of the conditions there he sent Timothy back to Thessalonica (1 Thess. iii, 1), while he himself (with Silas, see Acts xvii, 15 and xviii, 5) pushed on to Corinth. Making the acquaintance of Aquila and Priscilla, Jews lately banished from Rome, he joined them in working at the tent-maker's trade. At first he had little success, but the arrival of Timothy from Macedonia with news of the devotion and constancy of the disciples there stirred him to new efforts (cf. 1 Cor. ii, 1 ff; 1 Thess. iii, 1–6; Acts xviii, 1–8). For a year and a half Paul was busy at Corinth. To organize and build up a Christian community in that large, gay, wicked, commercial metropolis was no easy task. It was while here that he wrote his two letters to the church of Thessalonica. The first one was occasioned by Timothy's arrival with good news and is full of words of commendation and hope. The second was written to counteract certain wrong views or inferences, mainly of statements in the first letter. These epistles, perhaps the earliest of the New Testament books, show us the Apostle's mind before the great doctrinal conflicts of the next few years had engaged his attention. The long stay in Corinth was perhaps shortened by the unsuccessful attempt of the Jews to have him tried by Gallio, the Roman pro-consul. Though this came to nothing Paul seems to have left Corinth soon after (fall of 51 A.D.) and crossing over to Ephesus with Aquila and Priscilla he hastened on to Antioch (Acts xviii, 18–22).

His stay in Antioch was not a long one. He soon found himself on his Third Missionary Journey (Acts xviii, 23–xxi, 17, fall of 51 to spring of 55 A.D.). Rapidly going through his old field in Galatia he arrived at Ephesus, then the great commercial emporium of Asia Minor. Here for nearly three years he made his headquarters. For Paul this was a period of most intense activity. Ephesus was a meeting place for all sorts of philosophical and religious speculations. As the patron city of the worship of the great goddess Artemis (Diana) whose temple outside the city walls was one of the wonders of the world, it was a stronghold of paganism and superstition. It was an open door, «but there were many adversaries» (1 Cor. xvi, 9). But it was not alone in Ephesus that «adversaries» were opposing the Apostle. In his old churches in Galatia and in Corinth enemies were sowing seeds of discord. The mischief-makers were members of the extreme Judaistic party, whose opposition to Paul's Gentile Christianity had necessitated the council at Jerusalem in 49 A.D. Only apparently defeated there they determined to carry the conflict into the churches founded by Paul himself. Their arguments were, mainly, that Paul was only a secondary apostle, not one of the original 12, that his gospel was, therefore, only one derived by false reasoning from the normal gospel of Judaistic Christianity, and that Paul's principles practically made the whole Old Testament, especially the Law, of no character or value whatsoever. Only too many in Paul's own churches were ready to listen to such teaching. From Galatia and from Corinth there came news to Ephesus of factious strife, of the adoption of Jewish customs and of growing hostility to himself on the part of those he had taught and trusted. But Paul, though bitterly disappointed and sorely tried, was equal to the emergency. In the Epistles to the Galatians and Corinthians he tried to deal with these vexatious and difficult problems. In them he successfully met the points raised by his assailants and, at least in the case of the church of Corinth, succeeded in winning the church back to himself. For the details of these matters readers are referred to special articles on these Epistles. During his sojourn at Ephesus «all Asia» (Acts xix, 10) had the advantage of Paul's missionary activity. Not long after the tumult caused by Demetrius the silversmith (xix, 23–41) he set out for Corinth, but, uncertain of the reception accorded to his first letter (1 Corinthians) and subsequent messages, he took the indirect route via Troas and Macedonia. In Macedonia Titus came from Corinth with most encouraging news (2 Cor. vii, 5–7) and Paul gladly pushed on to revisit the Corinthian church. He stayed at Corinth during the winter of 54–55 A.D. Before leaving Greece for his long contemplated visit to Jerusalem he penned his most comprehensive and important epistle, to the Christians of Rome, in which he set forth the great fundamentals of the Christian theology and thus prepared them for the visit he had in mind to make them. (See ROMANS). Paul now hastened to Jerusalem, not stopping at Ephesus, but saying farewell to a delegation from that church that met him at Miletus.

At Jerusalem he presented the mother church with the great collection he had been gathering for some time and was cordially received by James and other leading members, but advised to give evidence to the Jewish Christians that he himself still followed the ancestral mode of life according to the Law (Acts xxi). Paul was willing to do this, but it brought him into conflict with certain fanatics who accused him of defiling the temple. These were not Jewish Christians, but Jews of Asia who knew of his work in Ephesus and were bitterly opposed to him. A great uproar followed in which Paul was nearly killed, and only rescued by the prompt action of the Roman captain who commanded the garrison of the castle of Antonia overlooking the temple. Paul's attempt to explain his position to the Jews only enraged them the more and soon after, convinced that plots were being laid against Paul, Lysias the Roman captain sent him under a strong guard to Felix, the governor of Palestine at Cæsarea. Although Felix soon discovered that Paul was not guilty of any serious offense, he kept him bound in easy confinement, partly from mercenary motives, until his recall about two years later (that is, about 57 A.D.). Felix was succeeded by Porcius Festus before whom Paul cut the whole matter short by appealing to the emperor (Acts xxv–xxvi).

Paul was sent to Rome at the first opportunity (57 A.D.). With other prisoners he experienced shipwreck near Malta and was compelled to remain there all winter. In the spring the voyage was resumed and in due time they arrived at Rome. Paul's resolution and courage had commended him to the centurion in charge during

the voyage, and he was in consequence treated leniently. Friends met them some miles outside of Rome. In the city, while awaiting the emperor's pleasure concerning his case, Paul was permitted to live in his own hired lodging and have free intercourse with any who might desire to see him. One of his first acts in Rome was to call the leading Jews of the city together and set before them the principles of Christianity. The result was, as usual, that some believed him; others did not. Luke says (Acts xxviii, 30–31) that this Roman captivity lasted two years (58–60 A.D.). If it had ended with his execution it would probably have been so stated. The natural inference is that he was released at the end of that period. It was during his Roman imprisonment that he wrote the 'Epistles of the Captivity,' that is Ephesians, Colossians, Philemon and, probably as the last, Philippians. In these epistles the controversies that raged in Asia and filled his mind when writing to the Galatians and Corinthians are no longer prominent. His mind is full of the thought of the Church of Christ, and of the great divine personality who is its head. It is in these beautiful epistles, especially in Philemon and Philippians, that the heart of Paul is seen as nowhere else except perhaps in 2 Corinthians. Some details as to Paul's experience in Rome may be gathered from Philemon and Philippians, not sufficient, however, to make a complete outline.

After his release (61 A.D.) Paul appears to have undertaken another missionary journey, possibly to Spain (Rom. xv, 24, also the tradition in Clem. Rom.). He afterward revisited the East and while there (according to what seems the most probable theory) wrote 1 Timothy and Titus. Again arrested he was brought to Rome for a second trial. Before this took place he wrote a letter to Timothy (2 Timothy) beseeching him to come to him as soon as possible. It was probably about 64 or 65 that the great Apostle was executed by command of Nero. (The points in this paragraph have been stated on the theory that the Pastoral Epistles are genuine Pauline letters).

It is hard to estimate adequately the significance of such a life. More than any other one Paul made Christianity the world-religion. No other man has so profoundly influenced the religious thinking of mankind. He was the greatest man of the Apostolic Age, if not of all ages of the Church. Yet he was ever the disciple and Jesus the Master.

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SAINT PAUL, a remarkable island in the Indian Ocean, half way between Africa and Australia, and about 50 miles south of the island of Amsterdam. These islands are the exact antithesis of each other, Saint Paul almost barren and Amsterdam covered with a dense vegetation. The island is two miles long, the highest point about 860 feet high and of volcanic origin. Goats, cats, rats and mice flourish, insect life is abundant and sea-fowl in multitudes are characteristic. Fisheries are excellent. Saint Paul was ceded by England to France in 1892.

SAINT PAUL, Minn., the capital of the State, is situated on the Mississippi River, which, flowing for six miles northeastward from Fort Snelling on the Minnesota, and then bending southward, forms a letter S at this point. The greater part of the city is on the north bank of the river and is contiguous with Minneapolis on the west. The banks of the Mississippi at Saint Paul are from 100 to 200 feet high, in three terraces. The first of these is largely occupied by railroad yards, the second by the business section and the third and highest by residences. The picturesqueness of the river scenery has enabled the city, in collaboration with Minneapolis, to achieve wonderful effects in parking and boulevarding. The Indian mounds, on the steep bluff that overlooks the river as it makes the southward turn of the S, have long been famous. Adjacent are the grounds of the Minnesota Fish Hatchery. Besides this river scenery the city possesses several lakes, two of which, Como and Phalen,

ST. PAUL

(MAIN PORTION)

Rand McNally & Co's New 11x14 map of St. Paul (Main Portion).
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Vicinity of ST. PAUL and MINNEAPOLIS

are appropriately parked and connected by a boulevard that continues on to the Minnesota State Fair Grounds in the northwestern part of the city. Altogether, the parks, playgrounds and drives of Saint Paul comprise over 2,000 acres; and in addition there are fine roads connecting the city with many fine lakes in its immediate vicinity. The largest of these is White Bear, 12 miles from the centre of the city. The opportunity thus provided for recreation, in both summer and winter, has been a chief contributor to the unusual health of Saint Paul; and another cause is the pure drinking water that the city procures from these outside lakes. The death rate is but nine per thousand. The mean summer temperature is 67; the mean winter temperature 8.4. The elevation above sea-level is 683 feet.

Buildings.— Within the past decade Saint Paul has been enriched by the erection of many fine buildings. Of these the most worthy of notice are the Public Library, a memorial to the late James J. Hill, the Railway Exchange, the largest railroad office building in the world, the Capitol and Merchants' national banks, the Saint Paul Hotel and the Catholic cathedral, which occupies a commanding site near the centre of the city. On another hill not far distant is the Minnesota Capitol, completed in 1905 at a cost of $4,000,000 and containing mural decorations by leading American artists, and the Minnesota Historical Library. Within easy walking distance of one another in the retail district are the Auditorium, which seats 10,000, post office, city hall, the stately old capitol, Lowry building, Manhattan block, Pioneer building and the Y.M.C.A. building. On the fair grounds are the grand stand, with a seating capacity of 25,000, livestock pavilion, used in the winter as a skating-rink, horticultural hall and several other structures of importance. A union passenger station costing $15,000,000 has recently been erected on the river front.

Public Works.— Saint Paul has 830 miles of streets, of which 90 miles are paved and 50 macadamized, 425 miles of sewers, 430 miles of water-mains, 400 miles of gas-mains and 170 miles of street railway track. Four routes connect the city with Minneapolis. The city is well lighted, having 1,200 incandescent cluster lamps, 5,000 gas incandescent and 2,700 nitrogen-filled lamps.

Commerce and Industry.— Saint Paul is the United States internal revenue collecting point for the Northwest and the United States army headquarters for the same territory. The meat-packing trade of the Northwest is strongly centred here, producing an annual value of $50,000,000; but with improvements being made an increase to $200,000,000 is imminent. The largest individual horse market in the United States is at Saint Paul. The manufacture of shoes, grass carpets, refrigerators, machinery, soft drinks, fur goods and law books employs a capital of $98,000,000 and produces annually $125,000,000, employing 23,000 persons.

Wholesale and Jobbing Trade.— Saint Paul, by virtue of its position at the head of navigation and as the capital city of Minnesota, early won precedence in the wholesale trade, and now contains some of the largest houses in the United States. In 1918 this trade amounted to $500,000,000.

Transportation.— As the head of navigation on the Mississippi the city has enjoyed enviable advantages in transportation. Until the coming of the railroads these advantages made Saint Paul the first city in the Northwest, and the railroads naturally made headquarters here. River traffic has declined, but the completion of the government dam at Minnehaha promises to revive it through the use of barges towed by launches and the city has prepared itself to take advantage of the new opportunity. Excursion boats carried 50,000 persons during 1918. The Great Northern, Northern Pacific, and Chicago, Saint Paul, Minneapolis and Omaha have main offices and shops at Saint Paul. In addition to these lines the Rock Island, Burlington, Great Western, Chicago, Milwaukee and Saint Paul and the Minneapolis and Saint Louis meet at the Union Station and at the Minnesota Transfer in the western end of the city. Freight cars to the number of 353,640 are handled annually. Besides the four traction routes connecting the city with Minneapolis, three rural trolley lines serve gardeners south and east of the city. Saint Paul, in close connection with Minneapolis, is the hub of a wheel-like system of railroads radiating in every direction and giving the city service to Chicago, Iowa, the Dakotas, Winnipeg, Duluth and Wisconsin points. Three routes are transcontinental.

Finance and Banking.—The bonded debt of Saint Paul is (1919) $8,360,000; the sinking fund is $220,983. The city has an assessed valuation of $467,670,129, of which $309,254,789 is real estate valuation and the remainder personal property and money and credits. The tax rate is 42 mills. This is levied, according to State law, on a 25 per cent personal valuation, a 40 per cent real estate and 100 per cent money and credits valuation. On this basis the resources of the city for 1919 were $7,402,140. Of this sum $180,000 was spent for improvements, $456,000 for police, $755,000 for fire, $1,535,170 for schools, $182,000 for library, $161,000 for parks, $1,250,000 for water and lighting. On 1 Jan. 1919 there was a balance on hand of $20,000. The city has 26 banks, capitalized at $16,000,000. They hold deposits of $133,489,000. Their clearings in 1918 were $1,057,199,127.

Education.— The public school system enjoys the advantage of being closely connected with the library, the same commissioner administering both. There are 60 buildings including four high schools, one of which is the Mechanics Arts. A teachers' training school is part of the system. There are 1,014 teachers and 30,000 pupils. Attending various parochial and private schools are 15,000 pupils. Saint Paul is easily accessible from the university, the grounds of which extend almost to the western limits of the city, and to the School of Agriculture and experimental farm adjacent to the Minnesota Fair Grounds in the northwestern part of the city. Within the city are Hamline University (Methodist), Macalester College (Presbyterian), Saint Thomas College and Saint Paul Seminary (Catholic), Concordia College (German Lutheran), two Lutheran seminaries and Saint Paul College of Law. In the

suburb of Saint Paul Park is Saint Paul College (German Methodist). Attending these institutions of higher learning are 4,000 students. In addition to them there are six business schools and 10 schools of music. The Saint Paul Institute conducts evening classes and lecture courses.

Libraries.— The main public library is housed in the beautiful Hill Memorial Library finished in 1917 at a cost of $1,000,000. It conducts three branches. In 1918 955,585 volumes were circulated. The city owns 210,000 volumes. Besides the public library students in Saint Paul have the advantage of the State Law Library of 75,000 volumes, the Minnesota Historical Library of 115,000 volumes and a complete file of Minnesota newspapers, the Carnegie Library at Hamline University, those of the other colleges, and the Ramsey County Medical Library.

Churches and Charities.— Saint Paul has been the home of the Catholic archbishop of the province of Minnesota since pioneer days. Besides the cathedral there are 27 churches of this faith. There are also 15 Episcopal, 24 Methodist, 18 Presbyterian, 18 Baptist, 12 Congregational, 6 Christian Scientist, 41 Lutheran, 10 Jewish and 39 of other denominations. The Wilder Charity, on a foundation of $2,778,000 of invested funds, is the chief instrument of remedial work in the city. Closely connected are the Wilder Baths. In addition there are 12 hospitals, two childrens' homes and other institutions ministering to the unfortunate.

Government.— Saint Paul is governed by a council of seven commissioners including the mayor, each of whom is elected, and then appointed by the mayor to the responsibility of administering a department of government. These departments are: Finance, public works, public safety, including bureaus of health, fire and police; parks, playgrounds and public buildings; public utilities, including bureaus of water, lighting, markets and control of utilities; and education, including the management of the library and auditorium. The commissioner of education chooses the superintendent of schools. The commissioners, sitting as a council, choose a clerk and corporation counsel. The mayor appoints the purchasing agent. Under this system the legislative and executive functions of government are united; but the judicial department is free from council control. The people have also reserved the right to elect the city comptroller. City elections occur on the first Tuesday in May in alternate years when the seven commissioners, comptroller, three justices of the peace, two municipal judges and four constables are chosen.

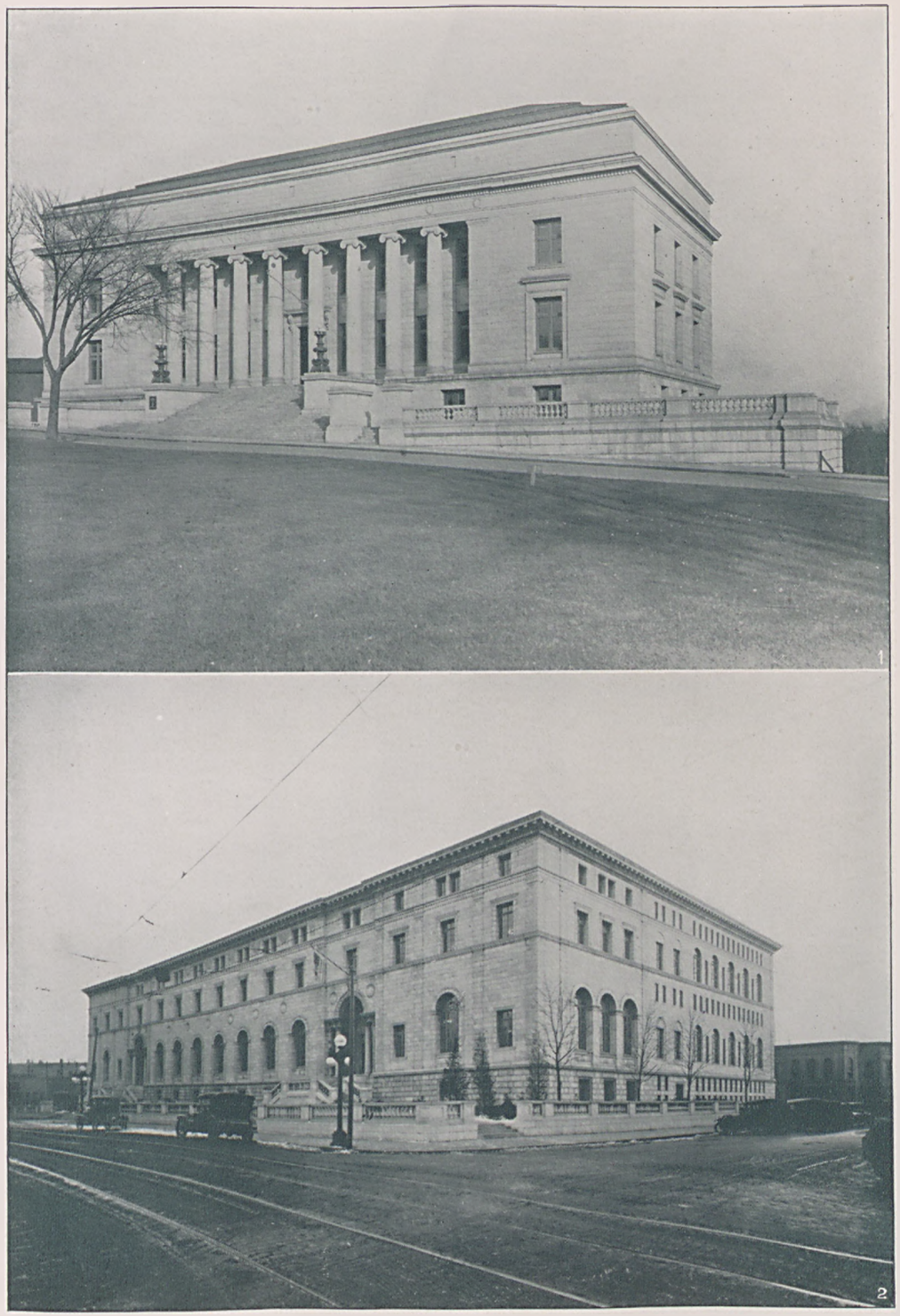
History.— The first settlement on the site of Saint Paul was a group of cabins about the hut of a whisky-trader, named on account of a defect, «Pig's Eye»; surnamed, Parrant. Swiss refugees from the Lord Selkirk settlement at Pembina, who had been driven off the Fort Snelling Reservation, added to the population. In 1841 Henry Jackson built a store on the river bank near the present Union Station; and steamboats found enough business to warrant stopping on their way to Fort Snelling. But it was Father Galtier, sent to evangelize the wilderness, who gave the rough station its name by erecting a log chapel which he called Saint Paul's. This was also in 1841. During the 40's the city, by reason of its position as the practical head of navigation, took the lead over other settlements and began to develop its famous ox-cart trade in furs and buffalo-meat with the Red River Valley. Upon the formation of the Territory of Minnesota in 1849 it was the logical capital, and through years of political battle remained so. Railway communication between Saint Paul and adjacent settlements, especially Saint Anthony (Minneapolis), Stillwater, on the Saint Croix, and points on the Minnesota River and the lower Mississippi were contemplated in the late 50's, after the first rush of immigrants to Minnesota; but the companies that were to construct the roads under pressure of financial panic, defaulted, so that it was 1862 before the first railroad train made its way from Saint Paul to Minneapolis; but during the next decade many thousands of miles were built in all directions from the capital which, to its great river business, now added the advantage of a rail centre. Its chief figure in the development of this business was James J. Hill, who, by reorganizing the Saint Paul, Minneapolis and Manitoba into the Great Northern and making it a pioneer into northern and western Minnesota, and later a transcontinental railroad, added immensely to the prestige of his city. In the late 80's an unfortunate speculative excitement which inflated property values and wasted the resources of the city in improvements far in advance of its needs, besides expanding the boundaries beyond reasonable limits, received the approval of almost the entire city. The result was a depression that retarded the growth of the city for several years — until the beginning of the new century. Since 1900, however, Saint Paul has enjoyed a constant and consistent development in industry, commerce, education and the higher life, as expressed in music, art and religion. Without increasing its area it has more than doubled its population during the past 20 years; and has expended its chief efforts to maintain and augment the natural beauty of its surroundings and to safeguard the health and insure the culture of its people rather than to exploit its real estate.

Population.— In 1850 there were in Saint Paul 1,112 souls; in 1880, 41,473; in 1890, 214,744; in 1920 (United States census), 234,595. Of these 25 per cent are of foreign birth, 45 per cent of foreign parentage. Of the foreigners 30 per cent are Scandinavians, 24 per cent Germans, 23 per cent Russians and Austro-Hungarians, 19 per cent English, Scotch and Irish (8 per cent of the last), and the remainder chiefly French and Italians with a sprinkling of Dutch, Belgians, Greeks and Turks.

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E. Dudley Parsons,
Author of 'The Story of Minnesota.'

SAINT PAUL DE LOANDA, lō-ăn'da, Angola or Portuguese Southwest Africa, a city, seaport, bishop's see, the principal Portuguese settlement on that coast, and capital of the



1 Minnesota Historical Society

2 Public Library (Hill Memorial)

SAINT PAUL, MINN.



Saint Paul Athletic Club (Corner Fourth and Minnesota Streets)

colony of Angola, on the south side of Bengo Bay, at the mouth of the river of the same name. The climate is comparatively healthful, the harbor is large, attractive and provided with three defensive works, and the city is built on sloping ground, on the heights of which are the principal residences, a railway line extends from Loanda to Lucalla (226 miles) and thence to Malanje (149 miles), with which it is intended to join the Central African Railway. In 1914 there entered the port 195 vessels of 293,531 tons, and cleared 187 vessels of 270,917 tons. The carrying trade with Europe was conducted by one Portuguese, three British and one German steamship line, the exports comprising ivory, coffee, rubber, hides, palm oil and beeswax. Loanda was formerly the center of an extensive slave trade, and in the 17th century was noted for its fine churches and monasteries, now mostly in ruins. Pop. 17,541.

SAINT PAUL SEMINARY, The, a Roman Catholic theological institution founded at Saint Paul, Minn., in 1890. Buildings, and an endowment, all totaling $500,000, were given by James J. Hill (q.v.); and the institution became the provincial seminary of the ecclesiastical province of Saint Paul. The seminary was opened in 1894. Archbishop Dowling is president of the board of trustees. The seminary has courses in theology and in philosophy; and three departments of instruction, theology, philosophy, and arts; the courses in the department of philosophy include mental philosophy, psychology, history of philosophy and biology; the courses in the department of arts include Hebrew, Greek, Latin, modern languages, and music, and form a part of the philosophical course; the study of Hebrew, is optional. The seminary has a campus of 40 acres, the land sloping gradually toward the Mississippi; the buildings include the administration building, the class building, .three residence halls, a dinner-hall, a gymnasium and the chapel. In 1919 the library contained over 25,000 volumes, the students numbered 213 and the faculty 12.

SAINT PAUL'S CATHEDRAL. See LONDON.

SAINT PAUL'S SCHOOL, a noted college preparatory school at Concord, N. H., founded in 1855 by Dr. George Cheyne Shattuck and incorporated on 29 June of the same year. It was opened on 3 April 1856, its first rector being Rev. Henry Augustus Coit who held that position till his death in 1895. By the terms of the founder's deed the trustees of the school must be communicants of the Protestant Episcopal Church. The course of instruction covers six years and the school is divided into six forms and an upper remove. In 1916–17 there were 47 masters and 360 students. The buildings, some 60 in all, are situated in a pleasant rural locality rather more than two miles from the city of Concord, the most important of these, architecturally, being the library, the imposing Upper School (built in 1903) and the spacious chapel, the latter containing a superb oaken reredos and a recumbent marble statue of the first rector of the school. The grounds belonging to the institution comprise about 2,000 acres. Rowing and cricket are the favorite sports of this school. The library contains 13,000 volumes and there are two literary societies, the Cadmean and the Concordian. There are 12 scholarships offered. The school journal, 'Horæ Scholasticæ,' was founded in 1860 and is issued monthly. Consult Adams, 'Some Famous Schools' (1903).

SAINT PAUL'S SCHOOL, London, England, an endowed grammar school, founded by John Colet in 1512, with no limitations as to country, nation or class. It was built to accommodate 153 students and until 1884 stood in Saint Paul's churchyard. It was instituted for the free education of poor children. The original building was burned down in 1666. In 1824, the second one, built by Wren, was taken down and another erected. In 1884 a new school was opened at West Kensington. The course of study was formerly classical, but is now designed to prepare for army examinations. It is interesting to note that Major André, Camden, Halley, Milton, Pepys, Judge Jeffreys, the Duke of Marlborough and Sir Philip Francis were students here.

SAINT PETER, one of the twelve apostles of Jesus Christ. Peter (from the Greek πέτρος a rock, of which the Aramaic equivalent was Cephas) was the son of a certain John or Jonah (cf. John i, 43; Matt. xvi, 17). He was born at Bethsaida of Galilee (John i, 44; xii, 21) but afterward resided at Capernaum where he had a house and was engaged in the fishing business in partnership with his brother Andrew, and with Zebedee and his sons James and John. (Mark i, 16–20; Luke v, 10–11). His proper name was Simon or Simeon, but the surname Cephas given him by Jesus (John i, 43; cf. Matt. xvi, 18) became, in its Greek form, Peter, the name he was generally known by in the early Church.

Since the firm to which Peter belonged owned boats and nets and hired assistants it is needless to think of Peter as poverty stricken, though it is not probable that he was wealthy.

Of his education we know practically nothing. It is likely that he spoke ordinary business Greek as well as his native Aramaic, for Galilee was largely bi-lingual. He may have been able to read the Old Testament in Hebrew. However, he was not "learned" in the rabbinical sense (Acts iv, 13). He was probably familiar with the Greek Old Testament, but knew but little of the Jewish scholarship of the day.

When John the Baptist appeared in the lower Jordan Valley with his announcement of the coming crisis, Peter and his business partners were among the many Galileans who went to hear the great preacher. Here he became acquainted with Jesus (John i, 40). This first acquaintance did not immediately result in full discipleship, since Jesus had not yet opened His public ministry. It is uncertain to what extent Peter accompanied Jesus before he was formally called when Jesus opened his Galilean ministry (Mark i, 16). Yet it was the earlier acquaintance with Jesus that prepared the way for the summons to a life-work (Mark i, 16; Luke v, 11), when at Jesus' word Simon left his nets and boats and became one of the daily companions of the Great Teacher. As yet, however, he was only one among many whom Jesus attracted to Himself during the early months of His work in Galilee. It was a testing time for Simon. He showed such appreciation of Jesus' person and teaching that he was chosen by Jesus to be one of 12, selected

from the larger body of "disciples" who were to be "apostles," that is, intimately associated with Him to learn of Him and (ultimately) be sent out by Him to declare His message and carry on His work (Mark iii, 14). With the brothers James and John he made a group of three with whom Jesus was most intimate and who alone were associated with Him on such occasions as the transfiguration and the prayer in the garden of Gethsemane. To Peter and his companions Jesus' refusal to allow the enthusiastic crowds, after the feeding of the 5,000 (Mark vi, 31–44; John vi, 14–15) to proclaim Him as Messiah must have been a great disappointment. But the Twelve remained steadfast and it was Peter who voiced their conviction a little later, in response to Jesus' searching question, that Jesus was indeed the Messiah (Mark viii, 29ff.; John vi, 68). According to Matthew (xvi, 18) this confession drew from Jesus the commendation "thou art Peter (that is, rock) and on this 'rock' I will build my church" The explanation of these words granting their genuineness has been a subject of much dispute. Roman Catholics hold that by them Christ conferred a personal supremacy over the Church upon Peter. Protestants deny this, and regard them merely as referring to the truth Peter uttered as the foundation of His Church. When Jesus soon after declared that it was necessary for Him to go to Jerusalem and suffer, Peter protested and was rebuked. The transfiguration scene opened his eyes more fully to the significance of Jesus' person. Thus his education proceeded, new lessons being learned daily. He was, of course, present during the experiences of Passion Week. He and John were sent into the city to prepare the Passover meal which became the Lord's Supper. He witnessed the agony in the garden. When the band arrested Jesus, Peter drew his sword and struck off the ear of one Malchus. Later, through the influence of John, he gained admission into the palace where Jesus' trial was proceeding. Here through cowardice he denied with an oath that he knew Jesus and then overcome by shame went outside and wept. He was a witness of Jesus' sufferings on the cross if not of His trial before Pilate. These scenes were so indelibly stamped on his mind that years after they retained their impression and shaped his thinking (1 Peter ii, 23; v, 1). The despair that settled over his soul when he saw his beloved Master die was not lighted by any definite hope of a resurrection. But when the women who were at the sepulchre early Sunday morning came with the news of an open and empty tomb, Peter with John ran to investigate. They found the tomb empty and returned to their company. Peter was the first of the Twelve to whom Jesus showed Himself after His passion (Mark xvi, 1–8; Luke xxiv, 35; John xx, 1–10; 1 Cor. xv, 5). For Peter this was a new birth, filled with a living hope (1 Peter i, 3). Later Jesus restored Peter to his full apostolic position (John xxi).

Peter now took a leading part in the direction of the little band of disciples that was the nucleus of the Christian Church. He proposed the election of a successor to Judas Iscariot (Acts i, 15ff.) and on the day of Pentecost made the first statement of Christian doctrine to the world. The sermon as given in Acts ii, 14–36 centres about the necessity of proving to the Jews that the crucified but now risen Jesus was indeed God's Messiah. The argument from the analogy between ancient prophecy and the recent events connected with Jesus was a convincing one to many Jews and large numbers confessed their faith in Jesus as Messiah. Until the persecution because of Stephen the new movement was confined almost exclusively to Jerusalem and it was Peter who had the chief share in the guidance of affairs. His associate was John. These two figure prominently in the accounts of the first conflicts with the Jerusalem authorities (Acts iii–iv). It was Peter who rebuked Ananias and Sapphira for their covetousness (Acts v, 1–11), who was spokesman for the apostles in their formal trial before the Sanhedrim (Acts v, 17–42), and whose fame was such that later tradition said that even his shadow was able to perform miracles (Acts v, 12–16). After the martyrdom of Stephen the Christian movement took on larger proportions. The work spread throughout Palestine and into neighboring countries. To a certain extent it was supervised by the apostles. Acts records two visitations by Peter in this connection. The first was when he and John were sent by the apostles to oversee the evangelistic labors of Philip in Samaria. Here Peter came in contact with the magician Simon, severely rebuking his cupidity and lack of spiritual perception (Acts viii, 14–25). The second tour was an extensive one in the regions of the northwest of Jerusalem (Acts ix, 32ff.). On it he healed Eneas at Lydda and raised Tabitha at Joppa. From Joppa he was summoned to preach the gospel to Cornelius, a Roman centurion stationed at Cæsarea (Acts x). This was the first recorded preaching of the gospel by Jewish Christians to Gentiles. In this matter Peter unexpectedly found himself doing what he had never done before, fellowshipping freely with Gentiles, recognizing them as Christian brethren and eating with them.

Naturally such conduct provoked sharp criticism on the part of the stricter members of the Jerusalem Church. Peter's defense was that he had been guided by the Holy Spirit and that the Spirit's presence had been manifested while he was preaching to the Gentiles (Acts xi). Sometime after this Peter was arrested by order of Herod Agrippa I, and imprisoned in Jerusalem with a view to executing him on the following day. But he escaped and left Jerusalem immediately (Acts xii, 1–17). Whither he went is not said and for all further knowledge of Peter's movements we must trust to incidental statements in the New Testament or to the very uncertain notices in early Christian literature. Since Herod Agrippa died in 44 A.D. the events narrated in Acts i–xii, in case they are arranged in chronological sequence, must have covered a period of about 15 years. We may say then that for that length of time Peter was the foremost figure of the early Apostolic Church. During this period, three years after his conversion, Paul visited Jerusalem to talk matters over with Peter (Gal. i, 18), staying with him 15 days. This must have been somewhere near 40 A.D. His subsequent career was, doubtless, just as important, but its details have not been preserved. About 49 A.D. Peter was present at the council in Jerusalem and took a leading part (Acts xv, 6 ff.; Gal. ii, 1–10). By this time he had become recognized as the "Apostle of the Circumcision" (Gal. ii, 7), through whom God was working as effectually as He was through Paul for the "Uncircumcision" (that is, the Gentile world). These expressions of Paul seem to indicate that Peter's activity was — like his own — largely missionary in character, to the Jews of the dispersion, as his was to the Gentiles. For this reason Peter was in Jerusalem only occasionally after his escape from Herod Agrippa in 44 A.D. We learn further, from Gal. ii, 11–14, that at Antioch, either soon after the council of 49, before Paul set out on his second missionary journey (49–52 A.D.), or at the close of that journey when Paul was at Antioch for a while (Acts xviii, 23), Peter was sharply rebuked by Paul for weakly yielding to emissaries of the strict Judaistic party of Jerusalem and withdrawing from familiar fellowship with the uncircumcised Gentile members of the Church. It is of interest to note that Paul's own words in Galatians imply that Peter, Barnabas and others had been in the habit of thus freely mingling with Gentile Christians, which is only what we would infer from Acts x–xi. Full fellowship with the Gentile converts was not discussed at the Council of 49. and Peter's withdrawal did not violate the terms of the agreement reached in the council. It violated the principles there followed, however, and deserved Paul's rebuke.

For the remainder of Peter's career we are in almost total ignorance. He appears to have continued his missionary labors. In these he was frequently accompanied by his wife (1 Cor. ix, 5). Early Christians looked back to him as the first bishop of the Church of Antioch. Whatever truth there may be in this tradition it is certain that he did not organize that great Church. Other ancient traditions speak of his labors in Asia Minor, especially in the regions near the Black Sea. These may be no more than inferences based on the address of the First Epistle. At what point in this later period are we to place the two epistles attributed to him? The authenticity of the first is more certain than that of the second. It was written from "Babylon" to the "dispersion" of northern Asia Minor. Both terms have been taken in a figurative sense and most scholars hold that it was written from Rome to Gentile Chrisians in Asia Minor. Neither of these positions rests on any very substantial evidence, though it is just more than possible that the letter was sent from Rome. Mark was with the apostle at the time, also Silvanus, who appears to have penned the epistle (v, 12–13). Since Silvanus was Paul's companion as late as when he wrote 2 Cor. (i, 19) Peter's letter must be dated after 55 A.D. And since Paul's later letters from Rome, Philippians, Colossians, Ephesians and Philemon (58–60 A.D.) betray no evidence of personal contact with Peter in Rome, the probability is that Peter was in Rome between 55 and 58, and thence sent his message to the churches of Asia Minor; not to the Pauline churches there, but to other communities that were less directly connected with Paul's work. To what place Peter went after leaving Rome, whence he sent the second letter, in case it is his, and whether he returned to Rome — all these are matters on which we possess no direct information. According to a widespread tradition, which has become generally accepted in Christendom, Peter suffered martyrdom at Rome. It must be admitted, however, that the direct evidence for this tradition cannot be traced much farther back than 180 A.D. At that time it was the firm belief of the Roman Church that both Peter and Paul were martyred at Rome and that the places of their martyrdom (or burial) could be pointed out. The same tradition thought of them as the founders of the Roman Church. All that can be said is that there is no sufficient ground for rejecting the kernel of the tradition, that is, that Peter was at Rome for a longer or shorter period and probably suffered martyrdom at that city. The Roman Catholic Church accounts Peter as the first Bishop of Rome and the first Pope.

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SAINT PETER, Minn., city and county-seat of Nicollet County, on the Minnesota River, and on the Chicago, Northwestern, and the Chicago, Saint Paul, Minneapolis and Omaha railroads, about 73 miles southwest of Saint Paul. It was settled in 1854 by Capt. W. B. Dodd; incorporated in 1865, and chartered as a city in 1873. It is in a farming and dairying region and in the vicinity are limestone quarries. The chief industrial plants are flour mills, machine shops, shirt and trouser factories, grain elevators, limestone quarries, iron foundries, creamery, etc. The State Hospital for the Insane, located here, accommodates about 1,200 patients. The educational institutions are the Gustavus Adolphus College, co-educational (Lutheran), about 375 students; public and parish schools, a Carnegie Library and an armory. The city has a national bank (1917) with capital $50,000 and resources $565,139. The government is vested in a mayor and a board of aldermen elected annually. The city owns and operates the waterworks and electric light plant, being the first city in the State to own such public utilities. Pop. 4,335.

SAINT PETER PORT, Channel Islands, capital of the Island of Guernsey, on the east coast, rises in terraces on the slope of a hill,

and presents a very attractive appearance from the sea. The streets are narrow and steep; the environs exceedingly beautiful, studded with handsome residences. The most interesting buildings are Saint Peter's cathedral-like church, a Gothic structure of the 14th century, Elizabeth College (1563), Ladies' College, public hospital, Hauteville House, where Victor Hugo lived in exile, 1856–70, and the handsome market. The Guille-Alles Library, founded by two New York merchants, natives of Guernsey, in 1882, contains 80,000 volumes. The Royal Court-House is used both as court of justice and as parliament house. The harbor is large and commodious, and is defended by the picturesque mediæval Castle Cornet on a rocky islet at its mouth and by Fort George, a modern fortification on the heights, about one half mile south from the town. Pop. about 20,000.

SAINT PETER'S, ROME. See ROME.

SAINT PETER'S CANAL. See CANADIAN CANALS.

SAINT PETER'S COLLEGE, or PETERHOUSE, England, is the oldest college in the University of Cambridge. It was founded as a hospital and converted into a college in 1257. This and the other sister colleges were modeled after the monasteries, to a certain extent. The present chapel was opened in 1632. The hall and combination rooms have been restored. The poet Gray belonged to this college; also Isaac Barrow, Archbishop Whitgift and Sir William Thomson. In 1916 there were 211 members of the senate; statistics of teachers and students not given because of the war drain.

SAINT PETER'S LAKE, Quebec, Canada, an expansion of the Saint Lawrence River, between the mouths of the Saint Maurice and the Richelieu, and extending nearly to Three Rivers. It forms the outlet of many rivers, chief of which is the Saint Francis. In its southern portion are found many islands, notable for their fine scenery. The length of the lake is 35 miles; the breadth, 10 miles.

SAINT PETERSBURG, Russia. See PETROGRAD.

SAINT PETERSBURG, Fla., city in Pinellas County, on Tampa Bay, and on the peninsula separating the bay from the Gulf of Mexico, on the Atlantic Coast Line and the Tampa and Gulf Coast Railroad. It is popular as a winter resort, has a beautiful beach, an excellent harbor, and is a shipping point for saltwater fish. Pop. (1920) 14,237.

SAINT PETERSBURG, Declaration of, an agreement between the European powers made in December 1868 at Saint Petersburg; signed by representatives of Austria, Belgium, Bavaria, Denmark, France, Great Britain, Italy, the Netherlands, Persia, Portugal, Germany, Russia, Sweden, Norway, Switzerland, Turkey and Württemberg. The powers agreed to use in war no explosive projectile of less weight than 400 grams, or 14 ounces avoirdupois. Other provisions were made to reduce the death rate and alleviate the suffering of injured and disabled soldiers by the use of more humane implements of war; practically all of the agreements were discarded by the Teutonic allies in the great World War.

SAINT PHILIP. See FOGO.

SAINT PHILIP, Fort. See FORT JACKSON AND FORT SAINT PHILIP.

SAINT-PIERRE, Jacques Henri Bernardine de, zhăk ŏn-rē băr-năr-dēn de săn pē-âr, French author: b. Havre, 19 Jan. 1737; d. Eragny sur-Oise, 21 Jan. 1814. He received his education at Caen and at Rouen, and entered the government service as a civil engineer. Dismissed for insubordination in 1761, he wandered about the Continent for several years before he began to write, endeavoring to realize a dream of a republican colony. He returned to France in 1766, and soon obtained a commission as engineer for the Mauritius, but after three years on the island he returned to Paris. His first book, 'Voyage à l'île de France' (1773), an account of his voyage to the island of Mauritius, did not attract attention. Sixteen years later his experiences in this lonely island became the background of his celebrated novel, 'Paul and Virginia,' which was published in Paris in 1788, and almost immediately translated into English, Russian, Polish, Dutch, Spanish and Italian. He was the author of two other novels little known beyond his day, and of two volumes of poetical studies of nature: 'Etudes de la nature' (1784); and 'Harmonies de la nature' (1796); He was admitted to the Institute in 1795. His works besides those already mentioned are 'Essai sur Jean Jacques Rousseau'; 'La chaumière indienne' (1790); 'Le café de Surate' (1790); and his 'Correspondance' (1826). (See PAUL ET VIRGINIE). Consult Barine, 'Les grands ecrivains français' (1891); Maury, 'Étude sur la vie et les œuvres de Bernardin de Saint Pierre' (1892).

SAINT-PIERRE, Jacques Legardeur de, zhăk lă-gär-dêr dē, French soldier: b. Normandy, 1698; d. near Lake George, N. Y., 1755. He entered the army in early youth and went to Canada where he served against the Iroquois and against the English in the War of 1740. He was one of the first to explore the Rocky Mountains, making the journey up the Saskatchewan River in 1752, and on his return was ordered to Fort de Bœuf, Ohio. While in command there he received George Washington, then adjutant-general of Virginia, who brought a letter from Governor Dinwiddie requesting the withdrawal of French troops from English territory. Washington in his journal comments very favorably on the French commander. Saint-Pierre was succeeded by Contrecœur in 1753 and was appointed to the command of the Indian auxiliaries. He rendered valuable services in Baron Dieskau's expedition and was afterward killed in the action near Lake George, where Whiting's regiment was routed. His account of the Rocky Mountain expedition is preserved in the National Library of Paris, and was published in the collection of John Gilmary Shea, 'Mémoire on journal sommaire de Jacques Legardeur de Saint Pierre' (1862).

SAINT PIERRE, a town on the island of Réunion, in the Indian Ocean, on the west coast, 34 miles south of Saint Denis, the capital and the terminus of a railway 83 miles long, connecting with the capital, with Pointe-des-Galets, the chief port, and with Saint Benoit on the east coast. Pop. 29,481. See RÉUNION.

SAINT PIERRE, West Indies, a former chief town in the volcanic island of Martinique (q.v.). Prior to the eruption in 1902 of Mont Pelée, Saint Pierre was the largest and most flourishing city not only of Martinique but of the Lesser Antilles, with a population of 26,000. It was an important seaport and a bishop's see. The principal buildings were the cathedral, lyceum and palace of justice. There was a fine botanical garden containing rare and peculiar specimens, etc.— all destroyed by the sudden catastrophe above noted, together with the entire population.

SAINT PIERRE AND MIQUELON, mĕk-lŏn. The small colony of Saint Pierre and Miquelon is doubly interesting for France inasmuch as it is the only one of the French settlements which is situated outside the tropical zone, and is furthermore the last link which exists of France's one-time Canadian empire. The colony, moreover, despite its small area, has been prosperous for a number of years, thanks to its fishing industry, but this latter has recently declined a little. The three islands of Saint Pierre, of Greater and Smaller Miquelon, have an area of 241 square kilometers (93 square miles) and a population of about 7,000. The islands are situated on the Atlantic Ocean, 15 to 30 miles from the southern coast of Newfoundland and about 3,700 kilometers (2,298 miles) from the port of Brest.

The form of Saint Pierre is most irregular: high and rocky from the cape of Aigle, running in an eastern, northern and western direction as far as Cape Savoiard; becoming inflected toward the country dominated by Mount Galadry. The island of Miquelon is divided into two parts: Greater Miquelon and Smaller Miquelon, the latter commonly called Langlade. Smaller Miquelon is separated from Saint Pierre by a stretch of sea about a league wide which is highly dangerous to navigation. Saint Pierre is the only part in the entire colony which possesses a harbor capable of anchoring large vessels arriving from Europe or America.

There are six islets dependent on Saint Pierre, Greater and Smaller Colombier and the four islets, Ile aux Chiens, Ile aux Vainqueurs, Ile aux Pigeons and Ile Massacre.

The climate is severe. Although Saint Pierre is situated in a more southerly latitude than Paris, winter is very cold and long; living conditions are hard and were it not for the fishing industry the country would be desolate.

Industries, etc.— Cod fishing is the only remunerative industry of the colony. This is a profitable trade for the ship-owners and makes an excellent school for sailors. The fisheries were very prosperous a few years ago, the exportation of cod amounting in 1899 to about 15,000,000 francs ($3,000,000), but fell to 6,000,000 in 1905 ($1,200,000), dropping still lower in subsequent years. Connected with the cod fishing industry are all the other seaport trades (carpentry, sailmaking, smithing, cooperage).

The agricultural resources of the colony are not very important. The island of Saint Pierre is really just a rock, almost devoid of fertile soil and would have been entirely unproductive if the inhabitants had not to a certain extent overcome nature. Miquelon is better suited for agricultural experiments. The average trade of Saint Pierre and Miquelon during the five years 1911 to 1915 was 11,517,267 francs ($2,303,453), made up of 4,331,459 francs ($866,291) imports and 7,185,808 francs ($1,437,161) exports.

History.—Fishing attracted Frenchmen there from the time of Henri IV. While many Normans and Saintonegals settled in Canada, Bretons and Basques came to the island in 1604 to fish for cod. Expelled from Newfoundland in 1713 and Acadia in 1763, many French Canadians settled in Saint Pierre and Miquelon. However, in 1778, the English forced these emigrants, numbering some 2,000, to return to France. After the Treaty of Versailles in 1783, they returned to the two islands only to be driven out again during the Revolutionary Wars, but came back in 1816 when the colony was definitely restored to France. The Anglo-French agreement of 8 April 1904 definitely settled all differences regarding the French shore, i.e., the rights of preparing and drying the fish. By this arrangement France retained fishing rights in the territorial waters of the French shore; or in other words over a coast 18 kilometers (12 miles) in length.

SAINT QUENTIN, săn kŏn-tăn, France, a city in the department of Aisne, on an acclivity overlooking the Somme, about 95 miles northeast of Paris. The location of Saint Quentin is of considerable strategic importance, and it has figured conspicuously in various wars, notably in 1557, in the Franco-German War in 1870, and most severely in the great World War of 1914–18. It was the centre of some of the most ruthless acts of warfare in the Teutonic assaults and little remained after the conflict but a great ruin pile. Under the terms of the Peace Treaty of 1919 German labor and capital, as determined by the Reparation Commission, have to effect a complete restoration. Prominent among its buildings is the fine Gothic church of Saint Quentin, erected 1114–77, with a special feature of double transepts. Other buildings are the courthouse, library, theatre, hospitals and lyceum. The principal manufactures are cotton and woolen goods, tulle, embroideries, lace and guipure of several kinds; there are important foundries, machine works for various special industries, brick and tile yards, and in the vicinity, numerous sugar mills. There is an active commerce in cotton and linen yarn and in grain. Several monuments and statues commemorate the defense of the town and its native literary celebrities. Pop. about 55,600. See WAR, EUROPEAN.

SAINT RAYMOND, Canada, village in the province of Quebec, on Little River Sainte Anne, 28 miles west of the city of Quebec, and on the Quebec and Lake Saint John and the Canadian Northern Railroad. There is a Roman Catholic convent and Saint Raymond's College is located here. Pop. 1,653.

SAINT REGIS, rē'jĭs, N. Y., and Canada, village, part in Franklin County, N. Y., and part in Huntington County in the province of Quebec, on the right bank of the Saint Lawrence River, at the mouth of the Saint Regis River. It was settled in 1760 by the Saint Regis tribe of the Iroquois Indians, and is inhabited solely by their descendants. Both the British and the American branches of the tribe speak the Mohawk language. The village is about five miles from a railroad station in New York State;

but it has steamboat connection with Cornwall, Ont., and in summer with all the Saint Lawrence River ports and with Hogansburg in New York, on the Saint Regis River. The village is in a fertile agricultural region; the Reservation extends along the Saint Lawrence, in both the United States and Canada, for a number of miles. Many of the Indians are engaged in farming, but the chief occupation is basket-making in which they excel. There are two churches, a Roman Catholic on the Canadian side and a Methodist on the New York side, on the boundary of the Reservation. There are five schools in New York and two in Canada. Eleazar Williams lived for some time in Saint Regis. Pop. 1,400.

SAINT REGIS INDIANS, a group of Roman Catholic Iroquois from Caughnawaga, Quebec, who during the French and Indian War were established in a village which is now the boundary between New York and Quebec. The Jesuits founded among them the mission of Saint Francis Regis, hence their present name. These Indians remained neutral during the Revolution, and their number was considerably augmented by other Iroquois early in the 19th century; but their reservation extending across the international boundary, they were divided in partisanship during the War of 1812. In 1904 the entire population was 2,634, of whom 1,426 were on the Quebec side and 1,208 on the New York side.

SAINT REMY, săn rē-mē, France, in the department of Bouches-du-Rhône, near the forest of Saint Benoit, is a village 14 miles northeast of Arles. It is celebrated for its Roman antiquities, the chief of which are the triumphal arch (100 A.D.) and the monument of the Julii. The latter is attributed to the period of the early empire, and consists of a square base ornamented with military basreliefs, surmounted by Corinthian semi-columns connected by arches, which support a second series of 10 Corinthian columns and a dome. Two statues stand in the upper portion. In the neighborhood of Saint Remy is the old priory of Saint Paul-de-Mausole with a Romanesque church and cloister of historic interest. Near the village are building-stone quarries, and seed-cultivation is carried on.

SAINT RONAN'S WELL, a novel by Sir Walter Scott, published in 1823. The scene is laid about a mineral spring, a quasi watering place, called Saint Ronan's Well. The book is the only society novel attempted by Scott.

SAINT-SAENS, Charles Camille, French musician: b. Paris, 3 Oct. 1835; d. Algiers, 16 Dec. 1921. He received his musical education in the Conservatory of Paris; in 1853 became organist of the church of Saint Merri, and in 1858 of the Madeleine, where he continued till 1877. His first comic opera, 'La princesse jaune,' was produced in 1872, and 'La timbre d'argent' in 1877. 'Samson et Delilah,' a sacred drama, was produced at Weimar also in 1877, and was subsequently successfully revived at Rouen. His grand operas 'Etienne Marcel' (1879); 'Henry VIII' (1883); 'Proserpine' (1887); 'Ascanio' (1890); 'Phryné' (1893), have not maintained their early popularity to the present day. He produced 'Andromaque' (1903), and 'L'Ancêtre' (1906), and was known also as a musical critic and author of 'Rimes familières' (1886); 'Problèmes et Mystères' (1894). He was elected member of the Academy in 1881. Although he did not attain highest rank in opera, many of his instrumental works, which include three symphonies, four symphonic poems, two orchestral suites, several concertos for piano and orchestra and violin and orchestra and a quantity of chamber music, show consummate talent if not genius. Consult Neitzel, 'Saint-Saens' (1899); Baumann, L'Œuvre de Saint-Saens' (1905).

SAINT-SIMON, Claude Henri, klōd ŏn-re săn-sē-mōn (Eng. sānt sī'mon), COMTE DE, French socialistic reformer: b. Paris, 17 Oct. 1760; d. there, 19 May 1825. Born of a family which traced its descent to Charlemagne he conceived that his origin destined him to great achievements. At 13 he offended his father by skeptically refusing to receive his first communion. Before he was 16 he gave his servant orders to call him in the morning with the summons, «Rise, M. le Comte, you have great things to do.» At 18 he entered the army and he served in the closing campaigns of the American War of Independence, distinguishing himself on the day of Cornwallis's surrender at Yorktown (17 Oct. 1781). Returning home with the order of Cincinnatus, he was captured in the naval combat in which the French were defeated by Rodney, and remained a prisoner at Jamaica till the peace of 1783. On his return he was created a Knight of Saint Louis, and appointed colonel of a regiment; but after a brief period of garrison duty at Metz, abandoned the service in order to travel. He went to Holland in 1785, and to Spain in 1787. Here he was successful in introducing diligences in Spain. On the outbreak of the Revolution of 1789 he joined himself to those who petitioned the assembly for the abolition of titles of nobility, but took no further part in the political movements of the time; being wholly absorbed in the pursuit of wealth. Speculation in the national domains created by the confiscation of the effects of the nobility and clergy afforded unlimited scope for his ambition. In this career he was joined by De Redern, whom he had known in Spain. Their speculations were at first unfortunate. Redern fled and Saint-Simon was imprisoned as a nobleman for 11 months. On his liberation he realized a considerable fortune by paying for the property he had acquired in assignats, the market value of which had fallen to six francs the thousand, while they were still received at full value in payment of the national domains. During his imprisonment he had plenty of time for reflection and the thoughts he entertained may be guessed from a vision which he had. «Charlemagne,» he relates, «appeared to me and said, 'My son, your success as a philosopher will equal mine as a warrior and statesman.'» In order to fulfil the mission which he had thus received he became in his 38th year a student of science, resided opposite the Ecole Polytechnique, and subsequently the Ecole de Medecine, in order to enjoy communications with the professors, whom he invited to his table.

In 1802 and 1803 he traveled in England and Germany, without, as he says, acquiring any new experience of importance. During his stay at Geneva he produced his first work, 'Lettre d'un habitant de Genève à ses contemporains.' He proposed that the savants should be maintained at the public expense; that spiritual power should be in their hands, temporal in that of the proprietors; while the «great chief of humanity» should be elected by the masses. Religion, he observed, was merely a human invention. Having exhausted his means he obtained the post of a clerk at the *mont de piété*. At this time he encountered Diard, whom he calls his only friend. This associate not only took on himself the charge of his maintenance, but provided means for the publication of his works.

The death of Diard in 1810 plunged him again into want; and having written two more works, 'Sur la science de l'homme' and 'Sur la gravitation universelle,' he found himself without means to publish them. Later Augustin Thierry, who became his intimate disciple, cooperated in editing his work on the 'Réorganisation de la société européenne' (1814), in which he endeavored to demonstrate the uselessness of the Congress of Vienna, and to show that a European parliament, with the right to determine differences between different nations, was the only means of preserving general peace; and for the promotion of this he advocated union between England and France. The last proposal, perhaps the most sensible he had yet made, caused him to be regarded as a madman. This was his first work which attracted general notice. Finding the difficulty of procuring the means of subsistence and of publishing his works increasing he made an unsuccessful attempt in 1823 at self-destruction, which resulted in a mutilated visage and the loss of an eye. He next produced his last work, 'Le nouveau christianisme' (1825), to which he owes his position as the founder of a sect. Christianity he now averred to be a progressive system, which had been rendered immovable by the bonds of ecclesiastical law. Taking its fundamental principle of love he held the Church to be a complete organization of society for ministering to the wants of the whole, and especially of the more numerous and poorer classes. A social hierarchy based on capacities and services, with authority to divide heritages, distribute salaries, regulate vocations and take all necessary means for making the labor of all contribute to the common good, was deduced from these premises by his disciples, among whom may be mentioned Auguste Comte, Bazard, Enfantin, Henri Fournel, Pierre Leroux, Félicien, David, Dubochet, Stéphane Morey, Olinde Rodrigues, Léon Halévy, Bailly (de Blois) and Duvergier. Saint Simon continued to the last to develop and promulgate his views in a periodical publication, *Le Producteur*.

The disciples of Saint Simon rapidly grew into a sect, and were joined by other eminent men. They attempted to idealize the life of their founder, and make it a consistent whole, dominated from the first by the idea of the mission he was to accomplish. Society was divided by the Saint Simonian doctrine into three classes, priests, savants and laborers, and was to be governed by the chiefs of the three classes. Capacity was to be the ground of distribution of functions. All property was to become on the death of the proprietor the property of the church or society. All children were to receive a general education till their particular capacities became manifest. Saint Simonism in short was an attempt to render men benevolent by external regulations; to do the work of Christianity without its authority and without its weapons.

Bibliography.— Hubbard, 'Saint Simon, sa vie et ses travaux' (1857); 'Œuvres choisies de Saint Simon' (1859–61); joint works of Saint Simon and Enfantin (20 vols, 1865–69); Booth, 'Saint-Simon and the Saint-Simonians' (1871); Janet, 'Saint-Simon et le Saint-Simonisme' (1878); Weill, 'Un Précurseur du socialism' (1894); Warschauer, 'Saint-Simon und der Saint-Simonismus' (1892); Weill, 'L'Ecole Saint-Simonienne' (1896); Charléty, 'Histoire du Saint-Simonisme' (1896).

SAINT SIMON, Louis de Rouvroy, DUC DE, French author: b. Paris, 16 Jan. 1675; d. Laferté, 2 March 1755. He entered the army in 1693, but soon resigned because not given anticipated promotion, then was employed in several diplomatic missions, and was one of the council of regency under the Duke of Orleans, but with the accession to the regency of the Duke of Bourbon he fell into disgrace, and withdrew from public life. His memoirs, commenced in 1694, while serving in the army, and on which he labored for 60 years remained a long time in manuscript, and were afterward published in a mutilated form, with many suppressions. The first edition, in 13 volumes, appeared in 1791; an edition by Cheruel and Regnier, in 20 volumes, in 1856 et seq., and revised in 1873–77; and the first complete edition appeared in Paris in 1829–31 (in 21 vols.), entitled 'Mémoires complets et authentiques du Duc de Saint Simon sur le Siècle de Louis XIV, et la Régence, publiés pour la Première Fois sur le Manuscrit Original Entièrement Ecrit de la Main de l'Auteur, par M. le Marquis de Saint Simon.' Consult Boschet, 'Le Duc de Saint-Simon' (1874); Boislisle, new edition of the 'Memoirs' (1880); Faugère, 'Écrits inédits de S. Simon' (Vol. I, 1881); Cannan, 'The Duke of Saint-Simon' (1885).

SAINT SIMON, sānt sī'mon, an island of Georgia, at the mouth of the Altamaha River, and separated from Jekyl Island, on the south, by Saint Simon Sound, and from Wolf Island on the north, by Altamaha Sound. It is one of a group of islands long famous for the production of sea-island cotton. In 1733 this island, together with some of the mainland adjacent, was ceded to James Oglethorpe by the Creek Indians. The settlement on the island was attacked in 1742 by a Spanish force from Saint Augustine. The soil is fertile and the vegetation luxuriant.

SAINT SOPHIA, sō-fē'ä, Constantinople, a renowned church and mosque, founded in 325–326 by Constantine, at the time when Byzantium became the seat of empire. Saint Sophia was enlarged, rebuilt, destroyed at various epochs, but the present structure is virtually that erected by Justinian. Over 10,000 workmen were employed seven years in its construction, and the rich materials used were taken from nearly every celebrated pagan temple in all parts of the kingdom. The building was approached by a double porch 100 feet in depth. The building formed a square of 241 feet, whose interior represented a Greek cross,

surrounded by a woman's choir or gallery, supported by magnificent ancient pillars. A series of domes rise from the centre and rest upon each other, tier upon tier. The height of the dome is 175 feet. The interior was decorated throughout with sculptured marble and fine mosaics. The sedilia of the patriarch and those of the priests were of silver gilt; the dome of the tabernacle of pure gold, surmounted by a massive gold cross studded by precious stones. The sacred vessels and other apparatus were of pure gold, the altar-cloths embroidered with gold and pearls, and the altar itself consisted of molten gold into which had been thrown pearls, sapphires, diamonds and all gems which might enhance its value to the utmost. Its weight amounted to 320,000 pounds, and its total cost was £13,000,000 or $65,000,000. When the Turks took possession of Constantinople in 1453, they transformed Saint Sophia into a mosque, destroying or concealing the Christian fittings or emblems, by coats of plaster. The mosaic pictures were saved in this way, and when Sultan Abdul Medjid ordered a complete restoration of the building, the original mosaics of Justinian were discovered. With the sultan's consent, the king of Prussia sent German artists to make accurate copies of these interesting antiquities, which were published by M. Salzenburg, the artist, at the expense of the Prussian government. The interior is at present restored for Mohammedan worship, and all Christian decorations, especially those representing the human figure, strictly forbidden by the Koran, are hidden from view under a white coating in which mosaics are imitated. Like all mosques, Saint Sophia is closed to all Christian visitors except by special permission, which is easily obtained by the hotel proprietors. Consult Von Hammer, 'Constantinopolis und der Bosporus' (2 vols., 1822); Salzenberg, 'Alt christliche Baudenkmale Konstantinopels' (Berlin 1854); Hughes, 'Aya Sofia Constantinople' (1854); *Edinburgh Review* (April 1865, p. 456 et seq.); Besant, 'Constantinople' (1879).

SAINT SULPICE, săn sül-pēs, the name of a famous seminary in Montreal, Canada, whose building is the oldest in that city, dating back to 1684. It is also the name of a famous seminary for priests in Paris, France.

SAINT SWITHIN, an English prelate of the 9th century, chaplain to King Egbert and tutor to his son, Ethelwulf. He was ordained to the priesthood in 830, was charged with the education of Prince (afterward king) Alfred, and in 852 was made bishop of Winchester. He died about 10 years later. He was canonized a century later. The popular knowledge of this saint's name is due to the belief that if rain falls on 15 July (which is commonly known as Saint Swithin's Day) it will rain for six weeks after. This notion is said to have arisen from the fact that when the bones of Saint Swithin were about to be removed, after his canonization, from their original resting-place in Winchester church-yard to the interior of the cathedral, their removal, which was to have taken place on 15 July, was delayed for 40 days by the excessive rains which fell uninterruptedly for that period. In France, the watery saints' days are those of Saint Médard (8 June) and saints Gervais and Protais (9 June); in Flanders the rainy saint is Saint Godeliève; and in Germany there are three saints' days, to which this belief attaches. The origin of the tribute called «Peter's Pence» has often been assigned to Saint Swithin.

SAINT THOMAS, formerly one of the Virgin Islands, Danish West Indies, since 1917 a possession of the United States, lying 43 miles east of Porto Rico; area, 33 square miles. The surface is hilly, and only a small portion of the land is cultivated; sugar-cane, aloes, fibrous plants, fruit, cotton and vegetables are raised. Earthquakes are frequent but not as destructive as the severe hurricanes, which have several times done a considerable amount of damage in the island. Saint Thomas was once of great commercial importance, its capital, Charlotte Amalie, was at one time one of the chief emporia of the West Indies. Since the introduction of steam vessels, and especially since 1885, its trade has greatly declined, and Barbados has taken its place as a trade centre. Charlotte Amalie is still of importance as a coaling station, and is a port of call for steamers. The island was first colonized by the Dutch, was held by Great Britain in 1667–71, 1801 and 1807–15, and finally came into the possession of Denmark. In 1870 negotiations were made for its purchase by the United States, but Congress refused to ratify the treaty; it was also included in the treaty of 1902 for the purchase of the Danish West Indies by the United States, which was rejected by the Danish Folkething. The final act of more than 50 years' effort to bring the Danish West Indies under the American flag was completed 31 March 1917, when a treasury warrant for $25,000,000 was handed to the Danish Minister at Washington for Saint Thomas, Saint Croix and Saint John. Pop. 11,150. See VIRGIN ISLANDS.

SAINT THOMAS, Canada, city and county-seat of Elgin County, Ontario, on the Canadian Pacific, Grand Trunk, Michigan Central, Wabash and Lake Erie and Detroit River railways, 75 miles southwest of Hamilton, and nine miles north of Port Stanley on Lake Erie. It is one of the most important railway centres in southern Ontario, is the receiving and distributing centre for a rich fruit and farming country, and has an extensive local and export trade. The Michigan Central Railway has large car-building and machine shops here employing many men, and there are important manufactures of foundry products, farm implements, carriages and wagons, mattresses, brooms, churns, blocks and tackle, flax, flour and planing mills, and breweries. Saint Thomas has gas, electric lights and waterworks; fine county buildings, city hall, market, Alma Ladies' College, Sinclair College, Collegiate Institute, public library, Amasa Wood Hospital, Thomas Williams Home for the Aged, children's home, 11 churches, many handsome residences and hotels, banks, and daily and weekly newspapers. Assessed property valuation about $9,874,957. Pop. 14,054.

SAINT THOMAS (Port. SAN THOMÉ, săn to-mă), West Africa, a volcanic island in the Gulf of Guinea, 170 miles west of the mouth of the Gabun River, belonging to Portugal. Its highest peak, Saint Anna, rises from the centre of the island to a height of about 7,000 feet. The valleys are fertile but unhealthful; the elevated portions, swept by fresh breezes, are on the contrary, salubrious. The chief products are coffee and cocoa, cotton, sugar, indigo, sweet potatoes, dates, etc. There are large numbers of domestic animals. Saint Thomas, on the northeast coast, is the seat of a bishop, and the chief town. The island was discovered by the Portuguese on Saint Thomas Day, 1471, and was colonized in 1493. The Dutch occupied it from 1641 to 1844. With the island of Principe it forms a province administered by a governor with a total area of 360 square miles, and total pop. of 68,221.

SAINT THOMAS. See SÃO THOMÉ.

SAINT THOMAS, Christians of. See CHRISTIANS OF SAINT THOMAS.

SAINT VALENTINE'S DAY, the 14th of February, so called after a Christian martyr of the Roman period. The custom peculiar to the day of exchanging missives of affection and love is believed to have been handed down from the Roman festival of the Lupercalia, celebrated in the month of February, when the names of young women were put into a box and drawn out by men as chance directed. For many centuries, if not up to the present time in certain remote districts, Saint Valentine's Eve was celebrated in a manner very similar to the fashion of Roman heathen times, maids and bachelors throwing billets with their names on into a receptacle and drawing therefrom by chance the name of some one of the opposite sex, who became thereupon for the year following the «valentine,» or chosen companion, of the other more or less lucky individual. The sending of valentines by message or mail is one outgrowth of the custom formerly prevalent. The custom has expanded in the presentation of affectionate valentines by parents to children and children to parents and husbands and wives to each other. In genial climates Valentine's Day is about the mating period of birds, and this is supposed to have had something to do with the origin of the customs with which the day is associated.

SAINT-VICTOR, săn-vēk-tōr, **Jacques Benjamin Maximilien,** COMTE DE, West Indian author: b. Fort Dauphin, Santo Domingo, 14 Jan. 1770; d. Paris, France, 8 Aug. 1858. He was educated at the college of La Fleche, France, and entered journalism. During Napoleon's reign he was on the staff of *Journal des Débats* and after 1815 he established several Roman Catholic and royalist magazines. He revisited his native land in 1830, spent two years in the United States and then made a tour of the West Indies. He wrote 'Tableau historique et pittoresque de Paris depuis les Gaulois jusqu'à nos Jours' (1808–12); 'Œuvres poétiques' (1882); 'Lettres sur les Etats-Unis ecrites en 1832–33' (2 vols., 1835); 'Journal de Voyage' (2 vols., 1836), etc.

SAINT-VICTOR, Paul Binsse, COMTE DE, French author: b. Paris, 11 July 1825; d. there, 9 July 1881. He first made himself known as a dramatic and art critic, but soon rose to eminence as a student of the drama and of art and a permanent contributor to the literature of these subjects. His best-known books are 'Men and Gods' (1867–72), and 'The Two Masques' (1880–83). He also wrote 'The Women of Goethe' (1869); 'Victor Hugo' (1885); 'Ancients and Moderns' (1886), and 'The Theatre of To-day' (1889).

SAINT VINCENT, vĭn'sĕnt, **John Jervis,** EARL, English naval officer: b. Medford, Staffordshire, 9 Jan. 1734; d. 15 March 1823. He entered the navy as able seaman in 1744 and in 1760 was promoted to captain and in 1787 to rear-admiral. In the Quebec expedition he led the advance squadron in charge of transports. In 1790 he was returned to Parliament for Wycombe. He commanded in the naval expedition against the French West Indies in 1793 and two years later was made admiral and given command of the Mediterranean fleet. In the engagement with the Spanish fleet of Cape Saint Vincent, 14 Feb. 1797, he captured four of the enemy's ships and averted the impending invasion of England. For this he was granted a pension and made Earl Saint Vincent. He was first lord of the Admiralty 1801–04 and introduced many reformatory measures. He held once more command of the Channel fleet, but retired in 1807. At his death the nation raised a statue to him in Saint Paul's Cathedral.

SAINT VINCENT, one of the Windward Islands, British West Indies, lying between Saint Lucia and Grenada, area, 150.3 square miles. A chain of volcanic mountains traverse the island from north to south, culminating in the volcano of Soufrière in the north (3,000 feet). Many of the valleys are fertile and about one-sixth of the total area is under cultivation. Sugar was once the most important product, but the sugar industry has declined, especially since the hurricane of 1898 which destroyed a large number of plantations. The production of arrowroot has correspondingly increased in importance; cocoa, cotton, fruits and vegetables are also raised, and good timber is obtained from the forests. There is a considerable trade, particularly with the United States. In 1914–15 the total imports had a value of $546,595; exports, $548,975; total revenue, $162,340; total expenditure, $190,225; public debt, $23,500. The island was discovered by Columbus in 1498, and was then inhabited by Caribs; the Caribs were finally subdued by Great Britain in 1795–96 and transported to Ruatan, in the Bay of Honduras; a few returned to Saint Vincent where a reservation was assigned them. The island is governed by an administrator and a legislative council of three official and four nominated unofficial members; before 1877 there was a representative government. In 1812 an eruption of Soufrière devastated a part of the island, and in May 1902 occurred another eruption, contemporaneous with that of Mont Pelée (q.v.). Premonitory signs of eruption were given as early as February 1901, and these warnings increased as soon as Mont Pelée began to be active; the eruption commenced on 6 May, with a burst of smoke, followed by flames; it ceased for a time the next morning, but reached its full force in the afternoon of that day (7 May). Several large plantations were destroyed and about 1,600 persons killed. Pop. 41,877.

SAINT VINCENT DE PAUL. See VINCENT DE PAUL, SAINT.

SAINT VINCENT DE PAUL, Society of. See SOCIETY OF SAINT VINCENT DE PAUL.

SAINT VITUS' DANCE. See CHOREA.

SAINTE AGATHE DES MONTS, Canada, village in Terrebonne County, Quebec, 60 miles northwest of Montreal, on Rouge River, and on the Northern Pacific Railroad. It has a lumber industry and is a year-round health resort. Pop. 2,020.

SAINTE ANNE DE BEAUPRÉ, sănt ăn dẽ bō-prā, Canada, a village of Montmorency County, Quebec, at the mouth of the Sainte Anne River, on the north shore of the Saint Lawrence River, 25 miles by rail northeast of Quebec. The fine modern basilica and the ancient parish church, containing relics of Sainte Anne, are visited annually on the saint's feast day, 26 July, by thousands of pilgrims. Sainte Anne is also a favorite summer resort, with up-to-date stores and hotels. Pop. 2,066.

SAINTE ANNE DE BELLEVUE, or **SAINT ANNES,** Canada, town in the province of Quebec, on the island of Montreal, between the Lake of Two Mountains and Saint Louis Lake at the confluence of the Ottawa and the Saint Lawrence rivers, 20 miles southwest of Montreal, on the Grand Trunk and the Canadian Pacific railways. The Macdonald College of Agriculture is located here and there is a Roman Catholic college. The town is patronized as a summer resort. Pop. 1,416.

SAINTE ANNE DE LA POCATIERE, Canada, town in the province of Quebec, on the Saint Lawrence River, 70 miles northeast of Quebec and on the Intercolonial Railway. There is a Roman Catholic college and also an agricultural experiment farm and milling industries. Pop. 2,412.

SAINTE-BEUVE, sănt bĕv, **Charles Augustin,** French literary critic: b. Boulogne-sur-Mer, 23 Dec. 1804; d. Paris, 13 Oct. 1869. He was educated at a school in his native town, and from 1818 at the Collège Charlemagne and the Collège Bourbon in Paris. He studied the physical and natural sciences under Lamarck and Magendie and in 1823 entered the school of medicine, subsequently becoming assistant surgeon to the Hospital Saint Louis. In 1824 he became a contributor to the *Globe,* a liberal and philosophical journal. A review of Victor Hugo's 'Odes and Ballads' contributed in 1827 gained him the friendship of the poet, and thenceforward he identified himself with the romantic movement. His first volume, 'An Historical and Critical Tableau of French Poetry and the French Theatre in the XVIth Century,' appeared in 1828. In 1829 appeared his novel, 'Vie, poesies, et pensées de Joseph Delorme'; and in 1830 he dedicated a volume of poems, 'Consolations,' to Victor Hugo. About this period he was associated with Saint Simonians, and afterward with Lamennais, but soon broke with them and also with Hugo and the romanticists. Persuaded by M. Buloz, he undertook a series of literary portraits for the 'Revue des deux mondes,' in which he displayed great skill. His novel 'Volupté' (1834), essentially autobiographical, may be regarded as marking this turning point in his career, but 'Pensées d'août' (1837), a volume of poems, is still colored by his religiosity. His next and greatest work, 'Port Royal' (5 vols., 1840–60), is a history of Jansenism. He was admitted a member of the French Academy in 1844 and four years later accepted a professorial chair at Liège. His lectures there formed the basis of his next work, 'Châteaubriand et son groupe littéraire sous l'Empire' (1860). He eagerly welcomed the *coup d'état* and finding it impossible under the second empire to secure a hearing at the Collège de France, where he was professor, published his undelivered lectures in a volume entitled 'Etude sur Virgile' (1857). In 1865 he was appointed a senator and regained popularity by his defense of freedom of thought and speech. In 1849 he began the series of Monday critical articles on literary subjects which has gained him a European reputation. These articles were published in two series, 'Causeries du lundi' (1851–62) and 'Nouveaux lundis' (1863–72). Among his other works are 'Portraits de femmes' (1844); 'Portraits littéraires,' 'Portraits contemporains' (1846); 'De la liberté de l'Enseignement' (1868); 'P. J. Proudhon, sa vie sa correspondance' (1872); 'Lettres à la princesse' (1873, being letters to Mathilde, sister of Napoleon III); 'Chroniques parisiennes' (1876); 'Correspondance' (1877–78); 'Nouvelle correspondance' (1880); 'Le clou d'or' (1880); 'La pendule' (1880), and 'Lettres au Professeur Gaullieur' (1895). (See CAUSERIES DU LUNDI). Consult D'Haussonville, 'Sainte-Beuve, sa vie et ses œuvres' (Paris 1875); Pons, 'Sainte-Beuve et ses inconnues' (ib. 1879); Troubat, 'Souvenirs du dernier secrétaire de Sainte-Beuve' (ib. 1890); Vattier, 'Sainte-Beuve' (ib. 1892); Fisher, 'A Group of French Critics' (1897); Brunetière, 'Evolution des genres' (Vol. 1, 1899); Harper, G. M., 'Sainte-Beuve' (New York 1909); Pollak, G., 'International Perspective in Criticism' (ib. 1914).

SAINTE CHAPELLE, Paris, one of the most interesting of the old architectural monuments of the French capital. It stands entire inside the Palais de Justice, in the large court to the left of the main entrance from the Boulevard du Palais. It was built in 1245–48, during the reign of Saint Louis, as the chapel of the royal palace, a few other remnants of which now form parts of the Palais de Justice. The main body (115 feet long and 36 feet wide) is a Gothic nave almost perfect in style. The upper chapel, used by the royal family, has an exquisite interior, and almost the entire wall-space is occupied by 15 large windows of stained glass set in beautiful tracery. Services are held in the chapel once a year at the opening of the courts.

SAINTE-CLAIRE DEVILLE, sănt'klār'-dẽ-vēl', **Henri Etienne,** French chemist: b. Saint Thomas, West Indies, 11 March 1818; d. Boulogne-sur-Seine, 1 July 1881, and educated in France. After considerable experience as a teacher of science he became professor of chemistry at the Sorbonne in Paris in 1859. He early began important and far-reaching researches into the phenomena of "dissociation," physicochemical reactions, which he was the first to study scientifically. In his own particular field of investigation and research he has done important work which increased and made more accurate our knowledge of chemical reactions. Deville put the aluminium and the magnesium industries on a practical and commercial footing and he produced both metals on a large industrial scale. He discovered toluene and anhydride of nitric acid and made useful researches into the metallurgy of platinum and other metals. Consult Gay, Jules, 'Henri Sainte-Claire Deville, sa vie et ses travaux' (Paris 1889).

SAINTE CROIX, kroi, an island of the West Indies. See SANTA CRUZ; VIRGIN ISLANDS.

SAINTE CUNÉGONDE, kū'nē-gond, Canada, a city of Hochelaga County, Quebec, two miles distant from Montreal, of which it is a suburb. It has many handsome residences, churches and schools and some manufactures. Pop. about 12,000.

SAINTE GENEVIEVE, sănt jĕn'ę-vēv, Mo., city, county-seat of Sainte Genevieve County, on the Mississippi River, 46 miles south of Saint Louis. It was first settled by the French in 1735, being the oldest settlement in the State. The site of this original settlement was about three miles south of the present site, but a severe flood in 1785 caused the colonists to move to higher ground. In 1810 it had a number of large stores and was the place from which Saint Louis obtained supplies. It is situated in an agricultural and stock-raising region; there are limestone quarries and copper mines in the vicinity, and the city contains several lime kilns and flour mills; fruit-growing and wine-making are also important industries. It is the seat of a Roman Catholic convent and academy. Pop. 2,046.

SAINTE THÉRÈSE, or **SAINTE THÉRÈSE DE BLAINVILLE,** tā'rēz dẽ blăn'vēl', Canada, village in the province of Quebec, on the Rivière aux Chiens, a loop of the Saint Lawrence River, 15 miles northwest of Montreal, on the Canadian Pacific Railway. There is a Roman Catholic college here and a convent. Industries include the manufacture of furniture and pianos. Pop. 2,120.

SAINTES, sănt', France, town in the department of Charente-Inférieure, 28 miles southeast of Rochefort, occupies a picturesque slope overlooking the Charente, which is crossed at this point by a bridge formerly supporting the ancient triumphal arch of Germanicus. Among other interesting Roman antiquities are the ruins of an amphitheater, which is only surpassed by the Colosseum of Rome. In the Antiquarian museums are preserved 7,000 medals and many pieces of sculpture. Saintes, anciently known as Mediolanum, was once a bishop's see; the ancient cathedral (Saint Pierre), still standing, was nearly destroyed (1568) by the Huguenots. There are other ancient churches, including Notre Dame, a fine example of architecture of the 11th and 12th centuries, and the church of Saint Eutropius, founded in the 6th century and rebuilt in the 16th. The other public buildings are the Palais de Justice, a communal college, library and theatre. There are manufactures of iron, copper, woolen and cotton goods, pottery, casks and leather. Trade is in wheat, corn, brandy, timber, etc. Saintes was the ancient capital of the Santones, and later, of the province of Saintonge. Pop. about 20,000.

SAINTIN, săn-tăn, **Jules Emile,** French painter: b. Lemé, Aisne, France, 14 April 1829; d. Paris, 14 July 1894. He studied under Drölling, Picot and Leboucher and won several medals in the Salon and a third-class medal at the Paris Exposition of 1889. Several years of his life were spent in the United States where he painted some fine portraits and several genres such as 'The Pony Express' (1863) and 'Abandoned' (1880). Among his American portraits is that of Stephen A. Douglas (1860). His work as a portrait painter was correct and academic, and most of his genre pictures derived their main interest from the subjects they represent, not from any inherent distinction of style or handling.

SAINTINE, săn-tēn, pseudonym of JOSEPH XAVIER BONIFACE, French novelist, poet and dramatist: b. Paris, France, 10 July 1798; d. there, 21 Jan. 1865. He wrote about 200 plays, a volume of poetry and several philosophical stories. His best known work is 'Picciola' (q.v.) (1837), which received the Montyon prize, ran through 40 editions and was translated into several languages. He published a series of stories entitled 'Jonathan, the Visionary' (1827); 'History of the Wars in Italy,' etc.

SAINTS' DAYS are days set apart by the Roman Catholic Church for religious services in honor of particular saints, after whom the days are named in the calendar. The celebrations differ in different countries, and according to the relation of the name of a particular saint to a particular locality. In the United States and Great Britain such celebrations take the form of religious services held in churches. In continental Europe and in South America saints' days often take the form of great municipal or even national celebrations. In Sweden, which is Lutheran as to state religion, it is customary to celebrate what is known as the name-day or day of the saint after whom a person is named, in a similar manner to a birthday.

SAINTS' EVERLASTING REST, The, a devotional work published by Richard Baxter (q.v.) in 1650. By its deep piety and its style of dignified eloquence, hardly a word of which has grown obsolete, it has taken a place with the 'Pilgrim's Progress' in the literary treasures of English Nonconformity. Consult French, 'Baxter and the Saints' Rest' (1877).

SAINTSBURY, sănts'bŭ-rĭ, **George Edward Bateman,** English literary critic: b. Southampton, 23 Oct. 1845. He was educated at Oxford, was senior classical master in Elizabeth College, Guernsey, 1868–74, when he became headmaster of Elgin Educational Institute 1874–76. From 1875 to 1895 he was engaged in journalistic and literary work in London, and in the last-named year became professor of English literature in Edinburgh University. He holds a leading place among contemporary English critics and among his many published works are 'Primer of French Literature' (1880); 'Dryden' (1881); 'Short History of French Literature' (1882); 'Manchester' (1887); 'History of Elizabethan Literature' (1887); 'Essays in English Literature 1780–1860' (1890); 'Essays on French Novelists' (1891); 'Miscellaneous Essays' (1892); 'The Earl of Derby'; 'Corrected Impressions' (1895); '19th Century Literature' (1896); 'The Flourishing of Romance and the Rise of Allegory' (1897); 'Sir Walter Scott' (1897); 'A Short History of English Literature' (1898); 'Mat-

thew Arnold' (1899); 'A History of Criticism' (Vol. I, 1900; Vol. II, 1902; Vol. III, 1904); 'The Earlier Renaissance' (1901); 'Loci Critici' (1903); 'Minor Caroline Poets' (Vol. I, 1905; Vol. II, 1906); 'A History of English Prosody' (Vol. I, 1906; Vol. II, 1908); 'The Later Nineteenth Century' (1908); 'Historical Manual of English Prosody' (1910); 'History of English Criticism' (1911); 'History of English Prose Rhythm' (1912); 'The English Novel' (1913); 'First Book of English Literature' (1914); 'The Peace of the Augustans' (1915).

SAIONJI, sī'ŏn-jē, **Kinmochi,** MARQUIS, Japanese statesman: b. Kioto, 1849. He studied law in Paris as a young man and became acquainted with M. Clemenceau and the younger Radicals of the Third Republic. He was for a time Minister Plenipotentiary to Germany and Austria-Hungary. For many years closely associated with the late Prince Ito, he succeeded the latter as leader of his party, became president of the House of Peers and of the Privy Council, Minister of Education and twice Prime Minister of Japan, 1906–08 and 1911–12. He is one of the three oldest statesmen of Japan, and acted as head of the Japanese delegation to the Inter-Allied Peace Conference in Paris.

SAIS, sā'ĭs, Egypt, in hieroglyphics SA, a ruined city on the Rosetta or Canopic branch of the Nile, 67 miles northwest of Cairo; site now occupied by the village of Sa-el-Hagar, or Sa of the Stone, which contains no remains of temples or palaces. It was an ancient religious capital, whose famous temple of the goddess of Neith contained the mysterious veiled statue, the subject of Schiller's ballad and of Novalis' romance. In Sais the fête of burning lamps was celebrated, attracting many foreigners; and here was a tomb of Osiris. Sais was also a renowned educational centre frequented by the Greek sages. It gave its name to two Egyptian dynasties, founded by natives of the city. The Saïti kings ruled Egypt for 150 years, until the country was invaded by the Persians under Cambyses. Consult Lepsius, 'Briefe' (p. 12); Wilkinson, 'Modern Egypt' (Vol. I, p. 183); Champollion, 'L Egypte' (Vol. II, p. 219); also Herodotus (II, 29, 59, 169), and Strabo (XVII, 801).

SAIVAS, sī'vaz, one of the three great divisions of the Hindu religion and meaning the worshippers of Siva. These are separated into sects which have varied in number at different periods in the religious history of Hindustan. The worship of Siva seems from a remote period more that of the learned and speculative classes than of the masses of the people. No poetic legends are recorded of this deity. Consult Wilson, 'Sketch of the Religious Sects of the Hindus' (1862); Monier-Williams, 'Religious Thought and Life in India' (1883); Barth, 'Religions of India' (trans., 1882).

SAJOU, same as SAPAJOU (q.v.).

SAJOUS, sa-zhoo', **Charles Eucharist de'Médicis,** American physician and author: b. at sea off coast of France, 13 Dec. 1852. He was graduated from Jefferson Medical College, Philadelphia, in 1878, and was clinical lecturer there 1884–90; professor and dean of the medical faculty of the Medico-Chirurgical College 1898, and professor and president of the faculty of Temple University Medical School after 1909. He received the degrees of LL.D. from Saint Joseph College 1909, and Sc.D. from Temple University in 1915; was made officer of the Academy of France in 1889; Knight of the Legion of Honor of France in 1892; Knight of the Order of Leopold of Belgium in 1890. Dr. Sajous is a Fellow of the American Philosophical Society and of the Academy of Natural Sciences and honorary and corresponding member of various foreign societies. He has edited Sajous's *Annual* of the Universal Medical Sciences (45 vols., 1888–96); Sajous' 'Cyclopedia of Practical Medicine' (8 vols., 1896 et seq.); is senior editor of the *New York Medical Journal* (1911—); was president of the American Medical Editors' Association 1903 and has written 'Diseases of the Nose and Throat' (1884) and 'The Internal Secretions and the Principles of Medicine' (1903–16). The latter work was the first to show that the ductless glands sustained life in the tissue cells and that they played a leading part in most diseases, as defensive organs.

SAKAI, sä'kī, Japan, on the southwest of the island of Hondo, seven miles south of Osaka. Before the rise of the latter town it was the chief commercial port of Japan. Osaka now monopolizes the trade. Pop. 67,706.

SAKHALIN, sä-gä-lēn', or **SAGHALIEN** (properly **KARAFTU**), Siberia, a long mountainous island in the north Pacific, opposite the mouth of the Amur. Its area contains 24,560 square miles. The Strait of La Pérouse separates it on the south from Yezo, Japan, and the Sea of Okhotsk bounds its eastern and northern shores. The narrow and shallow Strait of Tartary separates it from the mainland. Mounts Bernijet and Ktŏns-pal (2,000 to 5,000 feet) are the highest points of mountain ranges extending from north to south and interspersed with valleys of varying width. The principal rivers are the Tym and the Poronai, navigable for a short distance and teeming with fish, especially salmon. Petroleum and naphtha exist and coal is mined by Russian convicts. Agriculture does not succeed owing to the extremely rigorous climate. The island is covered with dense forests. Bears, tigers, sables and wild reindeer abound. Vegetation is Siberian in character. Sakhalin's history begins with the Stone Age, relics of which and of the Bronze Age are still extant, as seen in houses, bones and implements discovered. The island formerly belonged to the Chinese Empire, but early in the 19th century it was annexed by the Japanese who ceded it to Russia in 1875. By the Treaty of Portsmouth, N. H. (1905), following the Russo-Japanese War, the southern portion of the island was ceded to Japan by Russia, which retained the northern portion. The Japanese portion, now known as Karafuto, has an area of 13,253 square miles and a population of 49,463, and the Russian an area of 14,668 square miles and a population of 33,500. Besides the Russians and Japanese other inhabitants are Ainos, the aborigines, a primitive and peculiar race, Gilyaks and Oroks. The most important industry of the island is the herring fisheries, but large areas are highly adopted to agriculture and pasturage. There is a large forest area of larch and fir trees. The chief minerals are coal and alluvial gold.

SAKHARA, sāk-kä'rä, Egypt, the necropolis of Memphis, about two miles distant from the ruins of the ancient city on the confines of the Libyan Desert. The chief interest lies in its antiquities, tombs and catacombs. Many pyramids rise among its ruins, one of which is remarkable for its doorway of inlaid tiles, bearing a royal name. Mariette discovered numberless sarcophagi, catacombs of the sacred Ibis, tombs of the god Apis, numerous grottoes, etc. What is believed to be the oldest mummy in the world, that of a son of Pepi I of the 5th dynasty, probably over 6,000 years old, was discovered here.

SAKI, a South American monkey of the genera *Brachyurus, Pithecia* and related groups. Its marked peculiarities are a non-prehensile tail, covered with very long hair, round head, short muzzle, ears not unlike those of humans and long-hair covering of entire body. See MONKEY.

SAKI, sä'kē, or **SAKE,** the native beer and common stimulating drink of the Japanese. It is made from rice and is drunk warm, producing a very speedy but transient intoxication.

SAKIEH, sāk'ī-ĕ, **SAKIA,** or **SAKEEYEH,** a machine used in Egypt for raising water from the Nile for the purpose of irrigation. It is a modification of the Persian wheel and consists of a series of cogged wheels, turned by a buffalo or camel, each revolution of the wheel working up a series of earthen pitchers which empty themselves into a trough or pool.

SAKTA, säk'ta, the designation in the Hindu religion of a worshipper of the Sakti, the power or energy of the divine nature personified in a female form. If the tendencies of the worshipper are toward the adoration of Vishnu, then the personified Sakti is termed Lakshmi or Maha-Lakshmi; if it be toward that of Siva, the Sakti is dominated Parvati Bhavani or Durga. At least three-fourths of the Hindus of Bengal are of this sect, and of the remaining fourth, three are Vaishnavas to one Saiva. Wilson divides the Saktas into Dakshinis, Vamis, Kancheliyas and Kararis. Another classification is into the Dakschinacharis and the Vamacharis, followers of the Right Hand and of the Left Hand Ritual. Consult 'Religious Sects of the Hindus' (1862, p. 32).

SAKUNTALA, sa-kŭn'ta-lą. This masterpiece of Hindu literature is by Kalidâsa, the leading poet of India's second, or Sanscrit, period. It is a drama in seven acts and the underlying theme as well as many of its details are derived from the Mahâbhârata, the great national epic of the Hindu race. There are a number of versions of Sakuntâla (also spelled Çakuntâla or Shakuntâla) extant, the Bengalee one coming closest to the original. The drama has also been fashioned for the use of the European stage by Wolzogen, Donsdorf and others. The story of the play runs as follows: King Dushanta weds Sakuntâla, the adopted daughter of the pious hermit Kama, but on her being brought to his court he fails to recognize her, owing to a curse having been pronounced against him. The despairing bride is translated to the realm of the genii, until finally the recovery of a ring, the pledge of mutual faith and love, leads to the reunion of the couple. The great charm of Sakuntâla lies in the descriptive powers displayed by the poet, his keen appreciation of the beauties of nature and of the seasonal changes; his wealth of words is marvelous; his phraseology is often brilliant and picturesque, and the sentiments expressed, particularly as to the master passion, love, are delicate and psychologically true. The action, however, drags and is overburdened with side issues, and the diction suffers from its excessive artificiality and verbosity. Added to these defects is a lack of the sense of proportion, such as the Greek genius possessed in so high a degree. Nevertheless, all authorities are agreed on the rare and dainty charm of Sakuntâla, and Goethe bestowed unqualified praise upon it. The exact time when the poet Kalidâsa lived and wrote this drama is shrouded in uncertainty. Indian tradition and authorities variously assign the time to the 3d century B.C. and up to the 6th century A.D. From strong internal evidence, particularly because of the extremely corrupted form of the Prakrit spoken in the play by the women and subsidiary characters, it is now concluded that the correct period must have been the 2d or 3d century A.D. Consult Schuyler, Montgomery, Editions and Translations of Çakuntâla (in American Oriental Society *Journal,* Vol. XXII, Boston 1901); Henry, V., 'Les littératures de l'Inde' (Paris 1904); Macdonell, A. A., 'History of Sanskrit Literature' (London 1913).

WOLF VON SCHIERBRAND.

SAL-AMMONIAC. See AMMONIA.

SAL-TREE, a valuable timber-tree of India (*Shorea robusia*) second in importance only to the teak. It is found in large forests along the base of the Himalayas and again in another belt in eastern India. It belongs to the order *Dipterocarpaceæ* and yields a hard, heavy dark-brown, close-grained wood which is very durable and highly valued, particularly for gun-carriages and railway ties. A whitish aromatic resin (saldammar) used to calk ships and also for incense (see DAMMAR) is obtained by tapping the trunk. The tusser silkworm feeds on the leaves. The sal forests are protected by the government of India.

SALA, sā'la, **George Augustus Henry,** English journalist and author: b. London, 24 Nov. 1828; d. Brighton, Sussex, 8 Dec. 1895. He received some instruction in drawing, but at 15 was obliged to provide for himself. He was a theatrical scene painter for a time, then turned to etching and engraving and had some success as an illustrator. In 1848 he turned to literature and from 1851 to 1856 contributed regularly to *Household Words,* edited by Charles Dickens. His first experience as «special correspondent» was in the letters he wrote for this journal from Russia after the Crimean War. In 1863–64 he was in the United States reporting the Civil War for the *Daily Telegraph,* and later published 'My Diary in America in the Midst of the War.' He followed Napoleon III to Algiers and published as a result, 'A Trip to Barbary by a Roundabout Route' (1866). He established *Temple Bar,* a periodical which he edited from 1860 to 1866, and derived a large income from journalism, but much of his work is cheap and inflated, and no doubt was an important factor in the development of modern reprehensible newspaper methods. He wrote a critical biography

of William Hogarth (1860); and, in addition to works of travel already mentioned, 'America Revisited' (1882); 'A Journey due South' (1885); 'Right Round the World' (1888), works embodying his observations as a tourist and lecturer across the American continent to Australia and India.

SALAAM, sa-läm', or **PEACE BE WITH YOU,** the common salutation among Mohammedans. The answer is, "On you be peace and the mercy of God and his blessings." It is improper to address this answer to any but a believer.

SALAD PLANTS, various herbs whose tender, succulent foliage is eaten raw, with or without a dressing. In general, salads should be grown quickly and served as soon as possible after being gathered. They all delight in moist, rich soil with abundance of humus and nitrogenous plant food. Most of them may be sown as soon as the soil can be worked in spring, and some may be sown in autumn and allowed to remain until spring. Few do well in hot weather. Clean cultivation is essential with all of them, and since they are usually quick-growing plants, they are favorites for growing between the rows of later maturing plants, such as cabbage, peas, beets, etc., which are themselves used by market-gardeners in the same way, a later crop being put upon the land as soon as they are gathered. That is a crop of salads, one of cabbage and one of perhaps celery may be obtained from the same area in one season.

In America the most important salad is lettuce, which is extensively grown by truckers and market-gardeners, especially in the East from Florida to Massachusetts, the season starting in January in the South and advancing northward until June, the hot weather checking its production. In the autumn there is a less marked southerly migration. In the North large quantities are also grown under glass to supply local demands. Probably the endive ranks second as a market salad. Its consumption is, however, far less than that of lettuce, and it is less cultivated in the South than in the North, where the cooler climate is more suitable. As a home-salad mustard and cress are probably of next importance in America; in Europe they are grown in enormous quantities for the general market, but in America they are seldom offered for sale. Watercress is more important as a market salad and probably ranks next to endive. It is grown in streams or in damp ground, immense quantities being shipped to the Eastern markets from Virginia. Chicory and dandelion are both popular in the East, but probably more as pot-herbs than as salads. They usually require longer to attain edible size than lettuce and like endive are generally blanched. Chicory is occasionally used in the United States to make *barbe de capucin* and *witloof,* two salads very popular in Europe. The roots are dug in autumn, trimmed and for the former laid horizontally in pyramidal heaps with alternate layers of sand or soil in dark cellars and kept moist by occasional watering; for the second they are buried vertically and covered with some fermenting material for a few weeks. The former is the succulent leaf produced; the latter is a small head something like brussels sprouts. Either may be used as salad or as pot-herb.

SALADIN, săl'a-dĭn, or properly **SALAH-ED-DIN YUSSUF IBN-AYUD,** sultan of Egypt and Syria: b. Tekrit, 1137; d. Damascus, 3 March 1193. He entered the service of Nureddin, emir of Syria; became vizier in Egypt about 1169; suppressed the Fatimites in 1171; was proclaimed sultan in 1174 and conquered Damascus and Syria. The great object of his policy was to expel the Christians from Palestine, and recover the city of Jerusalem (see CRUSADES). An atrocious massacre of Mohammedan pilgrims by Chatillon added to his ardor; and his vow of revenge against the perpetrator he was enabled to make good by his famous victory on the plain of Tiberias in 1187, where he captured Guy de Lusignan, king of Jerusalem, Chatillon (whom he cut down after the battle with his own scimitar) and many more. The fruits of this victory was the towns of Acre, Said and Beyrout; after which he laid siege to Jerusalem, which yielded (1187) in a capitulation, to the articles of which Saladin faithfully adhered. He then proceeded against Tyre, but failed in consequence of the destruction of his fleet by the Franks. The intelligence of the loss of Jerusalem reaching Europe produced the Crusade under the Emperor Frederick Barbarossa (q.v.), whose death inspired Saladin with hopes soon damped by the arrival of the forces of Richard Cœur-de-Lion of England, and of Philip Augustus of France. The recovery of Acre by the two kings took place in 1191, upon which event Philip returned to France, and Richard, after twice defeating the sultan, took Cæsarea and Jaffa, and spread alarm as far as Jerusalem. At length a truce was concluded between Richard and Saladin (1192), by the terms of which the coast from Jaffa to Tyre was ceded to the Christians, while the rest of Palestine remained to the sultan. The departure of Richard freed Saladin from his most formidable foe. Though chargeable with unjustifiable means of acquiring power, Saladin employed it, when obtained, usefully for his subjects, whose burdens he lightened, while he benefited them by many useful works and establishments. Magnificent in his public undertakings, he was frugal in his personal expenses. He has been celebrated in Western literature for courage, moderation and justice. Scott introduces him into 'The Talisman,' disguised as the physician Adonbec and as Ilderim. Consult Gaston-Paris, 'La légende de Saladin' (Paris 1893); Reinaud, 'Notice sur la Vie de Saladin' (1874); Baha-ed-din, 'The Life of Saladin' (1897); Lane-Pool, 'Saladin, and the Fall of the Kingdom of Jerusalem' (1898); Yusuf ibn Rafi, 'The Life of Saladin' (tr. for Palestine Pilgrims' Text Society, London 1899).

SALADO, sä-lä'thō, a river of Argentina, rising in the eastern slopes of the Cordilleras, and emptying into the Paraná after a course of 750 miles. It is salty, hence the name.

SALAL, an evergreen shrub (*Gaultheria shallon*), of the northwestern United States, from 2 to 10 feet high, with dark-green leaves and reddish twigs, bearing racemes of flowers, succeeded in August by dark-purple fruit, "salal-berries," of the size of buck-shot, rough on the outside, very juicy and of a sub-acid flavor.

SALAMANCA, säl-a-măn'ka, Mexico, a town in the state of Guanajuato, situated in the south-western corner of the state, on the railroad to Guadalajara. It lies in a wide, fertile but somewhat marshy plain. Among its seven churches one is a Gothic structure built on an ambitious plan. The chief industry of the town is the manufacture of porcelain. Pop. 13,497.

SALAMANCA, N. Y., village in Cattaraugus County, on the Allegheny River, and on the Erie, the Buffalo, Rochester and Western and the Pennsylvania railroads, 54 miles south of Buffalo. It was incorporated as a village in 1878. The lumber business is the chief industry, and there are several saw and planing mills; the village also has a tannery, wire-mattress factory, cigar factories, an embroidery factory, and railroad machine shops. It contains a national bank with a capital of $50,000, and resources of $1,248,948. It has both natural gas and electric-light plants, and a gravity system of waterworks. The town has a public high school, established in 1881, with a school library of over 3,000 volumes; and a Roman Catholic parish school. Pop. 9,276.

SALAMANCA, sä-lä-măn'kä, Spain, (1) capital of a province of the same name, in Old Castile, 120 miles northwest of Madrid, occupying three hills on the right bank of the river Tormes. The bridge across the river rests on 27 arches and is of Roman foundation. Its numerous and magnificent ecclesiastical and educational institutions have secured for Salamanca the title of "Little Rome." On the great plaza are the town-house, post office and stores. The Plaza Mayor is one of the finest squares in Europe, and is surrounded by an arcade supported by 90 Corinthian columns. The cathedral, begun in 1513, is a fine example of the florid Gothic, with an elaborate portal, lofty dome and graceful interior columns. There are also an old and massive cathedral of Norman-French style (1102), numerous other churches, and as many convents; the College of Saint Bartholomew or Old College (1410), a classic building with an Ionic portico; College of Jesuits; that of the military order of Clatrava, College of the Archbishop (1522, by Fonseca), a colossal and sumptuous edifice with a fine façade and a chapel containing sculptures by Michelangelo; and Saint Domingo, the largest convent. The University of Salamanca is one of the most venerable and celebrated in Europe (13th century), whose students once numbered 14,000, coming from all parts of the globe. The cloisters of the two buildings comprised in the university are remarkably elegant, with graceful arches and elaborate moldings. There are numerous other schools, a theatre, bull arena, asylums, hospitals, handsome residences and palaces, etc. The most distinguished of the latter are the palaces of the Marquis of Valdecarzana and of the counts Garcigrande, Maldenadas, Espinosas and Monterey. There is an electric-light plant and manufactures of leather, blankets, hats and pottery. Salamantica (its ancient name) was an important city of the Vettones. In 222 B.C. it was taken by Hannibal and later under the Goths was a favored city. It was ravaged by the Moors and retaken in 1095. Columbus was lodged (1484–86) in the Dominican convent here. In 1543 Philip II was married to Mary of Portugal. In 1812 the Duke of Wellington gained a victory over the French under Marmont. Pop. 29,830.

(2) The province of Salamanca has an area of 4,829 square miles, the greater part of which is covered by forests of oak and chestnut, and an estimated population of 337,580. The principal rivers are the Tormes, Douro, Yeltes, Agueda and the Alagon. There are good harvests of cereals, hemp, oil and wine. Gold is found in the streams, and iron, lead, copper, zinc and coal in the hills, but the mines are only partially developed, partly due to the difficulties of transportation. The manufactures are unimportant and mainly for home consumption. The cloth of Bejar is especially good. Tanning of hides is a considerable industry. The province is traversed by a railway to Portugal. Besides the capital, the only other cities are Bejar and Ciudad Rodrigo.

SALAMANDER, the name applied generally to the species of tailed Amphibians (*Urodela*), but originally to the common European genus *Salamandra.* The smaller strictly aquatic species are known as newts (q.v.) or tritons; some of the larger species have received special names, as Kongo-snake, hellbender Siren and water-dog (qq.v.). The remaining salamanders are terrestrial or semi-aquatic and only rarely remain permanently in the water. One Californian species (*Autodax lugubris*) is partly arboreal. They are of small size and lizard-like form; but the popular notion that they are lizards is altogether erroneous as they are strictly batrachian in structure and life-history. The skin is smooth, glandular and scaleless, the skull possesses a well-developed parasphenoid bone and two occipital condyles, and all, except a few terrestrial species, pass through an aquatic gill-breathing stage. Some of the larger aquatic species advance but little beyond this condition; but in the great majority it is larval only and is succeeded by an abranchiate and sexually mature state. The axolotl (q.v.) of the genus *Amblystoma,* is a remarkable instance of a sexually mature larva. Many adult salamanders breathe by means of lungs, but a recent noteworthy discovery is the total absence of lungs in a large proportion of species, in which respiration takes place partly in the skin, but especially by means of a special vascular area of the pharynx. Most of the species deposit their large eggs in water, sometimes in a mass of jelly, as Amblystoma (q.v.), sometimes separately or in strings, as Spelerpes; but others, like *Desmognathus fusca* and *Plethodon,* seek drier places beneath stones and guard the eggs, and the terrestrial salamanders of Europe (*Salamandra*) are ovoviviparous. All are carnivorous and subsist upon insects, worms, etc. They are chiefly active at night, and during the day conceal themselves beneath stones and logs. During cold weather they pass into a more or less profound state of hibernation. Owing to the numerous cutaneous glands the skin is always moist and cold, from which arose the remarkable superstition that these animals, which, as a matter of fact require abundant moisture to sustain life, have the power not only of resisting, but of quenching, fire. Pliny records that he tried the experiment, and the salamander was burned to a powder; yet the fable continued to be credited till very recent times. From this old belief the name is applied to many articles, and by the ancients to a mythical creature, having fire-resisting qualities. The cutaneous secretion is poisonous to

many of the lower animals. (For a classification of salamanders see URODELA; for development see EMBRYOLOGY). Consult Cope, 'Batrachia of North America' (Washington 1889); Gadow, 'Amphibia and Reptiles' (New York 1901); Phisalix-Picot, Mme., 'Recherches embryologiques, histologiques et physiologiques sur les glands à venin de la salamandre terrestre' (Paris 1900).

SALAMANDER, a kind of gopher (q.v.).

SALAMBA, the native Filipino name for a kind of fishing apparatus, used near Manila, fitted on a raft composed of several tiers of bamboos. It consists of rectangular net, two corners of which are attached to the upper extremities of two long bamboos, tied crosswise, their lower extremities being fastened to a bar on the raft, which acts as a hinge; a movable pole, arranged with a counterpoise as a sort of crane, supports the bamboos at the point of junction, and thus enables the fishermen to raise or depress the net at pleasure. The lower extremities of the net are guided by a cord, which, being drawn toward the raft at the same time that the long bamboos are elevated by the crane and counterpoise, only a small portion of the net remains in the water, and is easily cleared of its contents by means of a landing net.

SALAMIS, săl'a-mĭs, ancient **PITYOUSSA** (Island of Pines), modern **KOLURI,** an island off the coast of Greece, in the Gulf of Ægina, about 10 miles east of Athens. It covers an area of about 30 square miles; is of irregular shape and rocky surface, and separated from the mainland by narrow, winding channels, giving access to the beautiful Bay of Eleusis, which has the appearance of a lake. Its soil is well adapted to the olive, and vineyards thrive. The other chief product is honey. The old city of Salamis stood on the south coast, and the famous naval battle of 480 B.C., between the Greeks and Persians, soon after the great battle of Thermopylæ, was fought in the narrow eastern strait. The new city of Salamis is on the northeast coast. The principal town is Koluri. Solon and Euripides were natives of the old city.

SALAMMBÔ, să'lăm-bō', by Gustave Flaubert, is an attempt to renew, in an age of science and according to the spirit of realism, the historical novel, which in its typical form as created by Walter Scott and practised by his numerous followers was an outgrowth of the romantic temper. It presents a reconstruction of the life of Carthage in the 3d century B.C., utilizing some of the events of the war of the Mercenaries against the Carthaginians as told by Polybius (Book I, last chapter). In preparation for his task he undertook a journey to the scene of his story, studied minutely the records and monuments of old Semitic civilization and sought patiently through familiar acquaintances with the present inhabitants of the region to discover in their life and character clues to the past. To those who impeached the accuracy of his picture he replied at length and in detail, citing authorities and warmly repelling all criticism that hinted either at ignorance or carelessness. But it is not for its erudition that the book has its fame, but for its art. Flaubert was first of all an artist, and if he took great pains to ensure truth in the matter of his work, he took even greater pains to clothe the material in a perfect garment of words. For him, as for all great stylists, there was but one perfect word and one perfect phrase in a given case, and he knew no peace nor rest till he had found it. Salammbô is not a moving tale of adventure, but a series of pictures, rich, full, vivid and exquisitely wrought, in a texture of words that caresses the ear. They have both an intellectual and a sensuous charm. But they are often violent, painful, abhorrent, leaving us oppressed with a sense of the cruelty and mockery of life in Flaubert's pessmistic vision of it. Sainte-Beuve devoted a series of articles to Salammbô in 'Nouveaux lundis' (Vol. V). Flaubert wrote a rejoinder that is to be found in current editions of the novel and in his 'Correspondence,' Vol. II. An English translation was made by M. French Sheldon (London 1886).

ARTHUR G. CANFIELD.

SALANDRA, sa-lăn'dra, **Antonio,** Italian statesman: b. Lucera, Apulia, 1853. For many years a professor of administrative law at the University of Rome, he entered Parliament as deputy for his native city and early became associated with Baron Sonnino (q.v.) in the "party of constitutional opposition" against the political degeneracy of "Giolittism." After holding various posts in several cabinets Signor Salandra became Premier in March 1914 on the resignation of Giolitti. During the first months of his administration he was engaged in a severe struggle against the Parliamentary majority controlled by Giolitti. On the outbreak of the European War, Salandra refused the assistance of Italy to Germany and Austria on the ground that the Triple Alliance stipulated co-operation only in case of an attack. The Foreign Minister in his Cabinet, San Giuliano, inclined more toward the Central Powers or at least benevolent neutrality. Nor was the Foreign Minister the only member of the Cabinet to oppose the Premier's policy. With the support of Signor Martini, the Colonial Minister (and a sincere friend of France), Salandra succeeded in overcoming the opposition of his colleagues. He had correctly gauged the temper of the country and the disinclination of the army and navy to fight on the side of Austria. His hands were strengthened by the somewhat opportune death of San Giuliano in October 1914, which enabled him to invite his former chief, Baron Sonnino, to accept the portfolio of Foreign Affairs. Both were resolved from the beginning to cast in their lot with the Allies in due course, though it was necessary first to place the army on an efficient footing and to break the links of economic dependence which bound Italy to the principal partner of the alliance. While Prince von Bülow and other agents of the Central Powers were exerting themselves to influence Italian opinion, the government prepared for the breach. At the instigation of von Bülow the ex-Premier Giolitti endeavored to stir up the king and Parliament to support the German cause, and to bring about the fall of Salandra. These machinations were an open secret and only served to heighten public indignation against the conspirators. Salandra decided on a bold stroke. He tendered his resignation to the king on 13 May 1915. Italy was electrified; enthusiastic gatherings demanded "War or the Republic." It was openly expressed that the king would stake his crown if he yielded. Three days later came the news that Salandra's resignation was not accepted; the demonstrations ceased; Giolitti and the German agents left Rome, and 10 days later Italy declared war. Signor Salandra resigned in June 1916 and was succeeded by Signor Boselli.

SALANGANE, a swift (*Collocalia fuciphaga*) of the Malayan Archipelago, famous as the producer of the edible birds' nests. See BIRDS' NESTS, EDIBLE.

SALARY GRAB, in American history, the popular name for the general increase in Federal salaries in 1873. The Constitution provides for the compensation of the President, senators, representatives, justices and Federal officers from the Federal treasury. The Act of 3 March 1873 provided that the President's salary be increased from $25,000 to $50,000, that of the chief justice from $8,500 to $10,500, those of the Vice-President, Cabinet officers, associate justices and speaker of the House from $8,000 to $10,000, and of senators and representatives from $5,000 to $7,500. Another act, 4 March 1873, was retroactive as regards the salaries of members of Congress during the previous two years. This, the essence of the "salary grab," excited so much indignation that the laws were repealed, except those affecting the salaries of the President and justices. By later legislation, enacted without adverse criticism, $25,000 was appropriated for the President's traveling expenses (59th Congress, 2d session), and his salary was fixed at $75,000 per annum (60th Congress, 2d session). In 1918 the salary of the Vice-President was $12,000 per annum; Cabinet officers, $12,000 each; chief justices, $15,000; associate justices, $14,500 each; circuit judges, $7,000 each; chief justices, Court of Claims, $6,500; associate judges, $6,000, and United States senators and representatives, $7,500 per annum each and 20 cents per mile for traveling to and from Washington.

SALAWATTI, să-lă-wă'tē, a Melanesian island off the western coast of New Guinea, off the northwestern extremity of Paupa, from which it is separated by Galewo Strait, covers an area of about 670 square miles. A chain of chalk cliffs, rising to a height of 2,500 feet, skirts the northern coast; the remaining portion is a deep valley covered with virgin forests. Salawatti was discovered by Watson in 1764. It is regarded as belonging to Dutch New Guinea. Pop. (est.) 5,000.

SALAYER, or SALEYER ISLANDS, East Indies, a small group of islands off the southern coast of Celebes from which they are separated by the Strait of Salayer, 13 miles wide. These islands form a part of the Dutch province of Macassar, the greatest native mart of the archipelago, in the trade passing east as far as and including New Guinea—tortoise shell, pearl shell, spices, birds-of-paradise skins and bechede-mer. The principal island of the group is Salayer, or Great Salayer, about 35 miles long by 8 miles broad. Pop. of group, 60,000.

SALDANHA (săl'dă'nă) **BAY,** South Africa, on the west coast of Cape Colony, 80 miles north of Cape Town, is a minor commercial port on the Atlantic, for the western territories of South Africa. It is chiefly of service in the coast trade, and of all the harbors of this seaboard is the only one affording shelter and anchorage at all seasons. It was formerly the chief Dutch naval station in South Africa.

SALE, George, English Oriental scholar: b. supposedly in Kent, about 1680; d. London, 13 Nov. 1736. Little is known of his life except that he was a solicitor in London, and at an early period turned his attention to the study of Arabic and other Oriental languages. In 1726 he began the publication of an Arabic translation of the New Testament for the Society for the Promotion of Christian Knowledge, and was for years engaged in the work of that association. He is best known by his admirable translation of the Koran in 1734, still highly esteemed. He wrote many Oriental biographies for Bayles' 'General Dictionary' (10 vols., 1734) and was a contributor to the Universal History' (1739). Consult Davenport, 'Sketch of the Life of George Sale.'

SALE, Sir Robert Henry, English military officer: b. Buckden, Huntingdonshire, 19 Sept. 1782; d. Mudki, India, 18 Dec. 1845. He entered the army with an ensign's commission in 1795, was promoted lieutenant in 1797 and in 1798 was ordered to India. He was engaged at Seringapatam, and in 1810 took part in the expedition against Mauritius. In 1813 he was promoted major, and in 1815 he returned to England with his regiment. He served in the expedition against Burma in 1824; in 1838 became brevet-colonel and was placed in command of a brigade in the army of the Indus. In the war with Afghanistan which followed Sale played an important part. He became major-general in 1840; was in command of the army which stormed Khurd Kabul Pass in 1841 and defended Jelalabad in the siege of 1841–42. He was knighted for his conduct at Kabul, received the thanks of Parliament for his services in the war, and the decoration of G.C.B. In the Sikh War he was wounded at the battle of Mudki, 18 Dec. 1845, and died three days later.

SALE, *in law.* See SALES.

SALEM, sā'lĕm, Ill., city, county-seat of Marion County, on the Baltimore and Ohio, Southwestern and other railroads, 97 miles southeast of Springfield. It is in an agricultural and coal-mining region; its chief industry is the culture, evaporation and shipment of fruit. It has also several flour mills. Under the Nationa Banking Law of 1913, it is in Federal Reserve District No. 8, and in 1917 had a national bank with a capital of $50,000, and resources $452,337. It contains a public high school, founded in 1870. Pop. (1920) 3,457.

SALEM, India, (1) chief town of a district of the same name, 207 miles southwest of Madras. It is well built, but unhealthy, being located in a narrow valley and subject to sudden and frequent changes of temperature. It has important manufactories of cotton, silk and cutlery. There is a municipal college, three printing presses, four reading-rooms and an English mission. Pop. 59,153. (2) The district embraces 7,529 square miles and is very hilly, intersected by broad plains. The principal rivers are the Cauvery with its numerous trib-

utaries. The forests are valuable, magnetic iron ore abundant, there are deposits of corundum and chromate of iron. The chief crops are millet, grain, rice, ragi, oil seeds and some cotton, indigo, coffee and tobacco. Much of the area is irrigated.

SALEM, Mass., city, one of the county-seats of Essex County, on a peninsula formed by two inlets of the Atlantic, known as North River and South River, and on the Boston and Maine Railroad, 14 miles northeast of Boston. It was founded in 1626 by Roger Conant and chartered by John Endicott in 1628. The church was organized 6 Aug. 1629 with Samuel Skelton and Francis Higginson as pastor and teacher. In 1633 Roger Williams was pastor of the church here, but was driven out in 1636. In 1692 the witchcraft delusion broke out, and 19 persons were hanged as witches on Gallows Hill, while Giles Cory was pressed to death for refusing to plead, the only instance on record in America under the English statute. (See WITCHCRAFT). In 1774 the first provincial assembly was held here and declared for the independence of the Massachusetts colony; and in 1775 the British under Captain Leslie were prevented from crossing the North Bridge in their search for arms and ammunition. Salem furnished over 150 armed privateers during the Revolution. It was incorporated as a city in 1836, and furnished a large quota of troops during the Civil War. It was the birthplace, and for a time the residence, of Nathaniel Hawthorne. Before the War of 1812 Salem had practically a monopoly of the East Indian and China trade; since then the foreign commerce has gradually been transferred to Boston and other ports, but there is an important coasting trade in coal, large quantities of which are landed here for transportation to inland towns. The manufacturing industries are also of importance; they include a large cotton mill, tanneries, a lead factory, chemical works, cordage works and shoe factories. In 1914 the city had 178 manufacturing plants, employing $9,823,520 capital, using materials valued at $7,936,035, and yielding products valued at $13,652,586. Under the National Banking Law of 1913, the city is in Federal Reserve District No. 1, and in 1917 had a national bank with capital $100,000, and resources $551,533. The city is connected with Beverly, Peabody, Marblehead, Lynn and other towns by electric road, and is a centre of local trade. The town is irregularly laid out, but has a number of beautiful modern residences and three public parks. There are also several of the earliest colonial houses standing, and a large number of mansions built in the days of the town's commercial supremacy; among the former are the Corwen, or «witch house,» and the birthplace of Timothy Pickering. Among the numerous points of interest in Salem are the old cemetery, formerly known as «The Burying Point,» the old courthouse, where the witchcraft trials were held, the new courthouse, the new city hall, the public library, the Salem Athenæum, the Essex Institute with a valuable library of nearly 400,000 volumes and the Peabody Academy of Sciences. The Essex Institute contains a valuable historical collection of relics of colonial days and the witchcraft craze, a fine collection of old furniture and works of art, and a large number of valuable manuscripts; the Peabody Academy of Sciences contains an almost complete Essex County natural history collection, an ethnological collection from the Orient, Mexico and South America, largely gathered by the Salem sea captains, Japan and China being largely represented; also an interesting collection of the models and pictures of ships built in Salem. The charitable institutions include a hospital, an old ladies' home, an old men's home and a city orphan asylum. The city has a public classical and high school established 1856, and three Roman Catholic parochial schools; it is also the seat of two private secondary schools, a commercial school and a State normal school. The city government is vested in a mayor, a board of aldermen of seven members and a city council of 24. Pop. 42,529. Consult Felt, 'Annals of Salem' (2 vols.); Osgood and Batchelder, 'Historical Sketch of Salem'; Powell, 'Historic Towns of New England'; Putnam, 'Old Salem'; Silsbee, 'Half Century in Salem,' and Visitor's Guide to Salem' (published by the Essex Institute).

SALEM, N. J., city, county-seat of Salem County, on the Salem Creek near its junction with the Delaware, and on the West Jersey and Seashore Railroad, 31 miles southwest of Philadelphia, Pa. It was first settled in 1641, and this first colony was succeeded by a Swedish fort; it passed into the hands of the Dutch, then to the English in 1664, and was in that portion of New Jersey which was bought by the Quakers in 1674. The Quakers established a new and prosperous colony, and in 1682 Salem was made a port of entry; in 1778 it was plundered by the British. It is the trade centre of a fertile agricultural region; and in addition to its railroad facilities has regular steamboat communication with Philadelphia. It has also a variety of manufacturing interests, including fruit canning establishments, iron foundries, glass manufactories, flour mills, an oil-cloth factory and a hosiery mill. It had (1917) two national banks with a combined capital of $250,000 and resources of $3,638,874. It contains a public library, founded in 1804, and a Friends' preparatory school. Pop. (1920) 7,435.

SALEM, Ohio, city in Columbiana County, on the Pennsylvania Railroad, 61 miles southeast of Cleveland. It is the largest town in the county, and the centre of a rich agricultural and stock raising region. Its manufacturing interests are numerous and varied; they include machine shops, manufactories of engines, wire nails, pumps and stoves, galvanized iron works, furniture, church furniture, church organ factories, brick-works and tile-works. There are two national banks with a combined capital of $200,000 and resources of $2,963,298. The city has a public high school, established in 1863. Pop. (1920) 10,305.

SALEM, Ore., city, capital of the State and county-seat of Marion County, on the Willamette River, and on the Southern Pacific Railroad, 44 miles south of Portland. It was first settled in 1840 by Methodist missionaries, was incorporated as a city in 1853 and became the State capital in 1860. It has regular steamer connection with Portland, and is the trade centre of a fertile agricultural region. Its manufacturing interests are numerous and important; they include flour mills, woolen mills, fruit

evaporating and canning establishments, tanneries, brick-kilns, tobacco factories, carriage and wagon factories, and agricultural implement works. In 1914 there were 67 manufacturing plants, employing $2,365,366 capital, and yielding products valued at $2,845,844. The city is well built with wide regular streets and two public parks. The State capitol, built in 1875–76, is a handsome structure; among the State institutions in the city are the Institute for Deaf-Mutes, the Institute for the Blind, the insane asylum, the reform school, and the penitentiary. Under the National Banking Law of 1913 the city is in Federal Reserve District No. 12, and in 1917 had two national banks with combined capital of $225,000, and resources of $2,726,256. The city contains the State and a Masonic library, and a public high school established in 1892; and is the seat of the Academy of the Sacred Heart (Roman Catholic), of the Capital Business College and of Willamette University (Methodist Episcopal). At Chemawa, a few miles distant, is an Indian industrial training school. Pop. (1920) 17,679.

SALEM, Va., town, county-seat of Roanoke County, on the Roanoke River, and on the Norfolk and Western Railroad, 51 miles west of Lynchburg. It is the centre of an agricultural and tobacco-growing region, and has a variety of manufacturing interests, including tobacco factories, tanneries, chair and carriage factories. It has a national bank (capital, 1917, $75,000, resources $679,573) and a State bank. The charitable institutions include two orphan asylums. There are medicinal springs in the vicinity, and it is a popular resort with Southerners. The town has a public high school, and is the seat of Roanoke College, established 1853 under the control of the Lutheran Church. Pop. 4,159.

SALEM, W. Va., city in Harrison County, on the Baltimore and Ohio Railroad, 14 miles west of Clarksburg, the county-seat. Its industrial establishments include three window-glass plants, a lamp-chimney factory, large planing mill, concrete block factory and gasoline refining stations. There are two banks, the Merchants and Producers, with resources of $700,000 and the First National, with resources amounting to $800,000. The value of the taxable property within the city is approximately $3,000,000. The educational establishments include Salem College, a high school and a public school. The most noteworthy public buildings are those of the educational establishments just mentioned and the churches. The government is vested in a mayor and council. The city's receipts in a recent year totaled $21,000, and the expenditures $16,000. Of the 627 residences within the city 410 are owned by the occupiers. Pop. 2,920.

SALEM WITCHCRAFT. See WITCHCRAFT.

SALEMA, a Pacific Coast food-fish (*Kyphosus analogus*), about 18 inches long and steel-blue in color. It is one of the rudderfishes, allied to the croakers, and several closely related species are known as chopas, especially *K. sectatrix*, a large West Indian and Florida form, which is called «chub» at Key West, and affords good sport for the angler.

SALEMI, Sicily, city of the province of Trapani, 64 miles south by west of Palermo. The city is located on an elevation 1,450 feet above sea-level. It contains the ruins of an old castle, a library, gymnasium, technical school. There is a trade in cattle, grain, wine and oil. Pop. 10,759.

SALEP, a demulcent and slightly nutritive drug, consisting of the oval tubers of certain orchids (*Orchis mascula* and *O. morio*), but not of the hand-shaped tubers of *O. latifolia* and other species. These tubers are prepared in central and southern Europe and in the Levant, and are dug up as soon as the flower-stalks decay, being then in best condition; the skin is rubbed off, and they are dried, appearing as brownish-yellow, translucent and horny bodies, inodorous and insipid in taste. The powdered salep, containing a large amount of mucilage and starch, makes a nutritious jelly with water, and is a suitable food for convalescents. The *Tacca pinnatifida*, growing in the islands of the Pacific, furnishes a starch called Otaheite or Tahiti salep.

SALERATUS, aerated salt; originally potassium bicarbonate, an imperfectly carbonated salt, formerly much used in cooking. The name is now commonly applied to the commercial article sodium bicarbonate, which is used in cookery to neutralize acidity and for raising dough through the evolution of carbonic acid, and is also a common constituent of baking-powders.

SALERNO, sa-lĕr'nō (Ital. sä-lĕr'nō), Italy, (1) capital and seaport of the province of the same name, on the Gulf of Salerno, 32 miles southeast of Naples. It stands upon an acclivity whose summit is crowned by the ruins of an ancient citadel, and is surrounded by a massive stone wall. The Marina is a broad promenade winding for one and one-half miles along the shore. The lava-paved streets are bordered with few good buildings, the chief of which is the cathedral (1084), of Gothic architecture, adorned with a portico of porphyry and Corinthian pillars from Pæstum — the ruins of which are in the vicinity. Here are the tombs of Margaret of Anjou, of Gregory VII and a sepulchre containing the bones of Saint Matthew. Other edifices are the governor's palace, theatre, hospitals, churches and convents. It also has courts of justice, a seminary and a lyceum. The chief industries are cotton and silk spinning and printing. The manufactures are glass, ceramics, macaroni, iron and leather goods, thread, linen, etc. There is excellent wine in the neighborhood. Founded by the Greeks, Salerno became an important city under the Romans, passing into possession of the Goths and later to the Lombards, who in turn were expelled by the Normans. Of the ancient city, Salernum, are still to be seen several temples, an amphitheatre and a theatre. In the mediæval period it was celebrated for its school of medicine, founded by Robert Guiscard (11th century). It was annexed to the kingdom of Naples at a later period. Pop. 48,247. (2) The province has an area of 1,916 square miles. It occupies the extremity of Campania on the Tyrrhenian Sea. It is covered with spurs of the Apennines, the chief of which are Monte Cervati, Polveracchio, Alburno and Sacro. The principal streams are the Tusciano, Mingardo and Alerto; the products are wheat, corn, flax hemp, olives, figs, wine and fruit. Pop. 571,213. (3) The Gulf

of Salerno, or Gulf of Pæstum, is a semi-circular indentation of the Mediterranean Sea, separated from the Bay of Naples by Point Campanellas. On its shores stand the picturesque and interesting towns of Amalfi and Salerno and the ruins of ancient Pæstum (q.v.).

SALERNO, School of (*Schola Salernitana*), a medical school at Salerno, Italy, famous in the Middle Ages, and important not so much for its contributions to medical knowledge as for its services in retaining the knowledge already possessed, through a period when all branches of learning were suffering decline, and forming a connection between ancient and modern medicine. As early as the 7th century some of the prelates of the Benedictine monastery at Salerno were famous for medical as well as other learning; but the school, or group of schools of medicine, which came into existence at Salerno was secular in character, the wives and daughters of the professors were often deeply learned and acted as teachers, and law and philosophy were taught as well as medicine. The school was at the height of its glory from the 9th to the 13th centuries; but from that time its decline was steady, owing to the more rapid advancement of other schools. At the zenith of the school's fame the city was known as *Civitas Hippocrates*, and it attracted many famous personages, among them William of Normandy, later Conqueror of England. The teachings of the school are fairly represented by existing works, but these are chiefly compilations founded on the teachings of Hippocrates and Galen. Such advances in knowledge as the school made were those of practical experience; and while a considerable knowledge of drugs was possessed at Salerno the treatment administered was in the main dietic. Anatomy they disregarded almost wholly. The medical school was dissolved by an edict of Napoleon in 1811, and the other departments closed in 1817.

SALES, sālz or sāl, Saint Francis de. See FRANCIS DE SALES, SAINT.

SALES. A sale is a contract by which property is transferred for a price in money. Usually the term is restricted to the sale of personal property. A sale is differentiated from other transfers of property by the fact that it is of the general or absolute ownership and by the further fact that it is for a price. A contract to sell, also called an executory contract of sale, is a contract by which the seller is to transfer property to the buyer for a price which the latter pays or agrees to pay. A contract of sale may be absolute or conditional.

To constitute a valid sale, there must be, as in all contracts, competent parties and mutual consent. In addition, there must be a subject matter to be sold and a price or consideration in money. If the price exceeds a specified amount, the contract of sale, to comply with the Statute of Frauds, must generally be in writing unless there is a part payment or some of the goods are delivered and accepted. A contract for the sale of goods not yet acquired by the seller is construed to be a contract to sell. If parties agree upon a sale, but do not fix the price, the law implies a reasonable price. The acceptance of an offer to buy or sell may be expressed or implied. Many questions of real difficulty arise in the law as to when title passes to the buyer, and the determination of the question is important in the law of insurance, liens, etc. Where a contract of sale provides that the buyer may return the goods or pay the price, the property in the goods ordinarily passes to the buyer subject only to a defeasance by the return of the goods. Under a completed sale of goods the title passes from the seller to the buyer immediately, at the place where the contract is completed. The intention of the parties controls if the sale is of specific or ascertained goods and this may be shown either by circumstances or declarations. If by the terms of the agreement any condition is to be performed or any material act to be done, as to identify the goods, the title generally does not pass until such act is performed. A sale on trial or approval is held to be a sale upon a condition precedent and the contract is executory, the title passing only after the buyer has accepted the goods.

Conditions are distinguished from warranties generally in that the former constitute the basis of the contract on a breach of which the parties may treat the contract as terminated, whereas a warranty is merely a collateral undertaking. Warranties are of two kinds: express and implied. Formerly the harsh rule of *caveat emptor* was applied to sales, but to-day the law protects the buyer by implying various warranties in contracts of sale. Generally speaking, an implied warranty arises on sales as to merchantability, title, fitness for purpose intended and that the goods shall fill the requirements of the contract, but not as to quantity, quality or value. See CONTRACT; WARRANTY.

The law of sales in England and Ireland has been much simplified by the Sale of Goods Act, passed in 1893. The law of Scotland differs somewhat from that of England as to distinctions between conditions and warranties and as to the application of the Statute of Frauds in relation to sales.

An effort has recently been made in the United States to simplify the law of sales by codification, and up to June 1917 this effort had met with substantial success by the enactment of the Uniform Sales Act in no less than 18 States of the Union.

EDWARD F. DONOVAN.

SALESIAN FATHERS. See ORDERS, RELIGIOUS.

SALESMANSHIP, The Psychology of. The salesman like the advertiser must influence the minds of men. He must influence men to buy goods and to buy his particular goods. Serving in such a capacity a knowledge of the fundamental principles of psychology will generally add to his effectiveness. He, too, must know when and how to make use of argument, when to appeal to this motive and when to that one. He must know that in most acts of deliberation there is a point when the occurrence of an apparently insignificant idea will swing a possible customer to favorable or unfavorable action and he must respond to that situation with the suggestive word destined to close his sale.

That the sales world recognizes the importance of psychological knowledge as a part of each salesman's equipment is clearly shown by the increasing number of books and articles intended to show how psychological fact may be used in increasing selling efficiency. Besides this there are growing up all over the country public and private sales schools and sales schools conducted by business organizations for their employees, all of which are teaching with varying degrees of success a new science of salesmanship which has as its basis the elementary principles of psychology.

The opinion is also spreading that not alone the salesman but also the man who employs him, needs psychological knowledge. The modern salesman is frequently given a thorough course of training before he is sent out to visit the customers of his firm or possible customers of his firm. Now modern educational methods rest upon a distinctly psychological basis, so he who would train men in a sales school must, like any other teacher, familiarize himself with educational psychology in certain aspects, at least, if he would make the most of the training period of his men.

Then there is another highly important application of psychology to the problems of the selling organization. The methods of selecting the sales force have been and are still in many instances of a surprisingly hit or miss character. As a new development, psychologists are being called in by certain progressive concerns to standardize their methods of selecting men. While the science of mental measurement is still in a comparatively undeveloped stage, certain facts regarding a man can be determined, with a fair degree of accuracy, by means of mental tests. For example, mental tests will give a strong indication of the general native intelligence of a man. This fact alone will not of course give complete information as to the selling ability of an applicant, but, all things considered, the greater native intelligence a man has the more likely he is to succeed in a selling position. So, when taken as additional information about an applicant, the information secured from such tests is highly valuable. Present mental tests investigations are hastening the day when more specific information about applicants for sales positions can be obtained by this method.

Psychological investigations into the problems of character traits, the judgment of such traits and their bearing upon specific lines of work are bringing out further results of great utility for the sales manager. In short, the sales organization, like all other organizations so intimately concerned with the modes of human thought and action and with the differences which we know exist between one man and his neighbor, is sure to reap increasing benefits from the modern efforts of psychologists to work out practical solutions for the problems of the human failures and misfits.

WALTER DILL SCOTT,
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SALFORD, sāl'fŏrd, England, a corporate town of Lancashire, adjoining Manchester, of which industrially and economically it is practically an integral portion, and with which it is connected by 16 bridges and several railroad viaducts; area, eight square miles. There are four parks, a museum and four public libraries. Pop. about 233,970. See MANCHESTER.

SALIC LAW, an ancient code or system of jurisprudence of the Salians, a tribe of Germans, who originally inhabited the country between the Meuse and the Rhine, but in the 5th century invading and conquering Gaul under Clovis, they founded the French monarchy. Their code appears to have been committed to writing about the 5th century, but according to Hallam it did not originate before the time of Clovis. The particular law, commonly called the Salic law, by which females were excluded from the throne of France, has been the subject of much dispute, and its modern application was probably fortuitous. The laws of the Salians do not appear to have usually excluded women from inheritance, and the particular law on which the exclusion rests did not originally refer to the crown, but to certain lands called Salic; and does not appear to have excluded women from the line of inheritance, but only from inheriting immediately. Its object may have been to secure the performance of military service. It remained in force from this time till the close of the French monarchy.

SALICIN, $C_{13}H_{18}O_7$, a glucoside, discovered by Leroux, existing in the bark and leaves of most varieties of the willow and poplar. Colorless, silky, crystalline needles, bitter taste, soluble in water or alcohol. Boiling with dilute acid gives glucose and saligenin or salicyl alcohol. Oxidation gives salicylic acid. Used to some extent as an anti-periodic in malarial disorders, but not as efficient as quinine. Believed by some to be valuable as a substitute for salicylic acid in the treatment of rheumatism. Dose 10 to 30 grains.

SALICORNIA, a genus of the *Chenopodiaceæ*, with about 10 species, growing in saline soils, named from the saline properties of the genus, and the horn-like branches. The three American species are curious naked, jointed plants, sometimes two feet high, with many opposite terete branches and leaves reduced to mere scales at the nodes, and appearing to ensheath the upper joints. The flowers are also reduced to pistils and stamens, and are pocketed in groups in hollows at the axils of, and behind, the upper scales. They are succulent herbs, so brittle as to be called glassworts, and grow over such large areas of marsh lands that when their usual green hue turns to red in the autumn they form great patches of vivid color. Hence the common name marsh samphire. There are five or six known species, and some of them yield soda in large quantities, especially the *Salicornia brachiata*, common along the coasts of India and those of Indian salt-lakes.

SALICYLIC (sal-ĭ-sĭl'ĭk) **ACID AND SOME OF ITS IMPORTANT COMPOUNDS.** Salicylic acid, ortho-oxy-benzoic acid, $C_6H_4.OH.COOH$, occurs in the free condition in the buds of the *Spiræa ulmaria* (meadow-sweet) and as a methyl ester in the oil of *Gaultheria procumbens* (wintergreen). It may be prepared by oxidation of saligenin, a compound obtained from salicin; also by action of carbon dioxide on dry sodium phenolate at ordinary temperatures. The resulting phenyl sodium carbonate is heated for several hours in an autoclave to about 285° when it is decomposed into dry sodium salicylate; which

is dissolved in water, precipitated by a mineral acid and the acid purified by recrystallization. A very pure form is obtained by the action of alkalis on oil of wintergreen. Fine white needle-like crystals of a sweetish acid taste, slightly soluble in cold water, easily so in hot. Its aqueous solution assumes a violet hue upon the addition of a small amount of ferric chloride. It is a valuable antiseptic, the presence of even very small amounts being sufficient to prevent the decomposition of most animal and vegetable tissues or products. Formerly used extensively in the preservation of milk, beer, cider, meats, canned goods and other food products, it has more recently been condemned as injurious to the digestive organs and to the general health, and in many of the States its addition to foods is prohibited. It forms a number of crystalline salts of the metals, the most important being.

Sodium Salicylate, a white or pinkish white finely crystalline body, of a sweetish taste, soluble in water or alcohol. Often used as a preservative in place of the free acid, but the most important use is as a remedy for rheumatism, gout, etc. Dose from 10 to 30 grains.

Methyl Salicylate, $C_6H_4.OH.CO.OCH_3$, forms about 90 per cent of the oils of wintergreen and of birch. It may be made synthetically by the distillation of two parts salicylic acid, two parts methyl alcohol and one part concentrated sulphuric acid, and is then called synthetic oil of wintergreen. The compounds derived from salicylic acid that are used in medicine are very numerous, some of the important ones being Salicylanid, Saloi, Salophen, Betol, Salifebrin, Salipyrin, etc. They are used as antiseptics or as antirheumatics.

SALICYLOL, SALICYLIC ALDEHYDE, or **ORTHO-OXY-BENZOIC ALDEHYDE,** is a volatile oil occurring in the blossom of the meadow-sweet. May be obtained by careful oxidation of saligenin or salicin. An aromatic oil, colorless when pure but turning red on exposure to light and air, slightly soluble in water, easily so in alcohol. Used to some extent in the perfume industry, and as a flavoring substance. Said to be added to vermouth and other liqueurs.

SALIDA, sa-lī'da or sa-lē'da, Colo., city in Chaffee County, on the Denver and Rio Grande Railroad, 64 miles southwest of Colorado Springs. It is the centre of a mining region where iron, copper and silver are the principal ores; marble, onyx and limestone are also quarried in the vicinity, and agricultural, dairying and stock-raising interests are of some importance. Medicinal hot springs have made Salida a favorite health resort. It has good roads and some of the best mountain scenery in the West. The city contains large railroad shops, and two banks. The Rio Grande General Hospital is located here, and there is a public high school. The chief public buildings are the library, city hall and churches. The value of taxable property is $3,050,000. The government is vested in a mayor and council. The municipal receipts and expenditures average $38,000 yearly. Pop. 4,689.

SALII, sā'lī-ī, priests of Mars in ancient Rome, so called from the Latin word *salire,* to leap and dance. Numa fixed their number at 12; Tullus Hostilius added another 12, who were called Salii Collini. Their origin is thus accounted for by the Romans: In the time of Numa, Rome was desolated by a pestilence, which ceased when the gods let fall from heaven the "ancile" (a shield of a peculiar form). The soothsayers declared that this shield was the sign of the perpetuity of the Roman power, and advised that 11 others should be made similar to it, so that the true ancile could not be so easily purloined. This advice was followed. On the 1st of March every year when the Salii offered sacrifices to Mars they carried the shields about the city, clashing them together, executing warlike dances and singing the Salian hymns — ancient songs in praise of Mars and the other gods, and of distinguished men, particularly of Mamurius, who made the 11 shields. The dress of the Salii was a purple tunic embroidered with gold, and bound with a brazen belt, and a toga with a purple border. On their head they wore a high cap in the form of a cone, with a sword by their side, a spear or rod in their right hand and an ancile in their left. None but patrician youths whose parents were alive could be admitted among the Salii.

SALINA, sā-lē'na, Kan., city, county-seat of Saline County, on the Smoky Hill River, and on the Union Pacific, the Missouri Pacific, the Atchison, Topeka and Santa Fé and the Chicago, Rock Island and Pacific railways, 110 miles west of Topeka. Salina was founded in 1857 by Col. William A. Phillips; became a borough in 1873 and a city in 1880. It is governed by a mayor and eight councilmen, elected for two years. It is the commercial centre for a fertile agricultural and stock-raising region, and a valuable salt springs and gypsum quarries are in the vicinity. It has several grain elevators and exports large quantities of grain; extensive flour and paper mills and other manufactories. Under the National Banking Act of 1913, the city is in Federal Reserve District No. 10, and in 1917 had two national banks with combined capital of $3,796,648. There are 11 denominational churches, high school, public library and Federal court buildings. It is the seat of Saint John's School (Protestant Episcopal), Kansas Wesleyan University, Normal University and the Kansas Wesleyan Business College. Pop. (1920) 15,085.

SALINA CRUZ, Mexico, Pacific seaport in the state of Oaxaca, 12 miles south of Tehuantepec, on the Tehuantepec Railroad, of which it is the southern terminal. It had a fine harbor and steamship connection with many foreign countries. Pop. 6,138.

SALINA FORMATION, or **SALINA STAGE,** in North American geology an important group of beds, belonging to the upper part of the Silurian series (q.v.), named from a township in Onondaga County, N. Y., where salt springs, issuing from this formation, were discovered in the 17th century by the Jesuit missionaries. The formation, which consists mainly of shales, with frequently extensive salt and gypsum beds, comes to the surface in an east and west belt extending from Herkimer County, N. Y., westward across the Niagara River into Canada. Its erosion has caused a belt of low, often swampy, country, averaging normally from 8 to 15 miles in width, which is followed by the Erie Canal and the New York Central and other railroads. The formation extends across Canada, where its outcrop is chiefly drift-covered, into Michigan, where it comes to an end. Southward it is known in northern Ohio (500 feet thick) at a depth of 2,000 feet below the surface, but disappears in southern Ohio. Southeastward the formation is known in Pennsylvania and Maryland. The salt of the formation is distributed in irregular lenticular beds, which, with their outer stratified shale seams, often aggregate several hundred feet in thickness. The salt is largely obtained from wells by the leaching process and the solar evaporation of the brine. The chief localities where this is carried on in New York State are Syracuse and Warsaw. The beds of this formation are for the most part non-fossiliferous and were deposited in an enclosed basin or dead sea which characterized eastern North America in late Silurian time. See PALEOZOIC; SALT.

SALINAN (sā-lē'nan) **INDIANS,** named from Salinas River. A linguistic family of North American Indians formerly inhabiting parts of San Luis Obispo, Monterey and San Benita counties, California, their habitat extending from the Coast Range to the Pacific and from the headwaters of the Salinas River to near the present Solidad. They subsisted by hunting and fishing, eking out their livelihood by means of acorns, seeds and roots. They manufactured coiled basketry, but of their general habits and customs almost nothing is known. No name for themselves as a body, for their language or for any division, either in their own or in any other Indian language, is known. They were named by Lathman (1856) and Powell (1891), and are known to have practiced cremation. The missions of San Antonio (1771) and San Miguel (1797) were established among them by the Spanish fathers, the baptisms during the mission period numbering 4,400 and 2,400 respectively. The population gradually decreased, however, and now the stock is represented by only a score of individuals.

SALINAS, sa-lē'nās, Cal., city and county-seat of Monterey County, 85 miles southeast of San Francisco, on the Southern Pacific and the Pajaro Consolidated railroads. It is situated in an agricultural and dairying region and sugar-beet culture is an important industry. In the town are machine shops and flour mills and nearby is a large beet-sugar factory. Pop. 4,308.

SALINAS, a river in California, in Monterey County, which flows north by west into Monterey Bay. It is about 150 miles long.

SALIS-SEEWIS, zā'lis-zā'vis, **Johann Gaudenz,** BARON VON, Swiss poet: b. Seewis, canton of Grison, 26 Dec. 1762; d. there, 29 Jan. 1834. He went to Paris in 1779, entered the Swiss Guards and eventually became adjutant to Masséna. He lived in Switzerland after 1793, was influential in Swiss politics and until 1817 was inspector-general of the Swiss military forces. His verse was widely known and deals chiefly with nature. Several of his poems were translated by Longfellow. His collected verse appeared 'Gedichte' (1793; 12th ed., 1839).

SALISBURY, sālz'bū-rī, **Edward Eldridge,** American philologist: b. Boston, Mass., 6 April 1814; d. New Haven, Conn., 5 Feb. 1901. He was graduated from Yale in 1832 and from Yale Divinity School in 1835. After some years spent abroad in the study of Oriental languages, he was professor of Arabic and Sanskrit at Yale in 1841–54. On resigning the chair he provided an endowment for it and subsequently gave the university his Oriental library. He was president of the American Oriental Society in 1863 and for several years conducted its official organ. He was the author of a 'Discourse on Arabic and Sanskrit Literature' (1843); 'Principles of Domestic Taste' (1877); 'Genealogical and Biographical Monographs' (3 vols., 1885–88), etc.

SALISBURY, Robert Arthur Talbot Gascoyne Cecil, 3D MARQUIS OF, English statesman: b. Hatfield, Hertfordshire, 3 Feb. 1830; d. there, 22 Aug. 1903. He was a descendant of the great Lord Burghley, Queen Elizabeth's Secretary of State. Educated at Eton and Oxford, he was elected a Fellow of All Souls' College in 1853 and in the same year was elected member of Parliament for Stamford in Lincolnshire. He held this seat as a Conservative or "Tory" until his succession to the marquisate on the death of his father in 1868. As a young man he visited Australia and New Zealand, where he worked for a time in the gold mines. While in the Commons he was known as Lord Robert Cecil, until the death of his elder brother in 1865, when he assumed the courtesy title of Viscount Cranborne. Between 1860 and 1883 he contributed 33 articles to the *Quarterly Review* on foreign affairs and weighty domestic problems. For some years, also, he wrote editorials on foreign affairs for the London *Standard.* In Parliament he quickly made his mark as a brilliant and caustic debater, active in the discussion of public measures and an uncompromising upholder of the central doctrine of conservatism, namely, that it is better to endure almost any political evil than to risk a breach of the historic continuity of government. In the Derby Cabinet (1866) he became Secretary of State for India, which post he resigned in 1867 because of the Reform bill. In 1869 he was elected chancellor of the University of Oxford, and was again sent to the India Office by Disraeli in 1874. At the close of the Turkish-Serbian War in 1876 he was sent as Special Ambassador to Constantinople, visiting the Paris, Berlin, Vienna and Rome chancelleries on the journey. He was virtually the leader of the seven plenary meetings held at the conference, which broke up in January 1877 on Turkey declaring that its recommendations of reform were inadmissible — and Europe withdrew to await the inevitable war. At the end of the Russo-Turkish War (q.v.) Salisbury became Foreign Secretary three weeks after the signing of the Treaty of Saint Stefano, when he immediately issued the famous "Salisbury Circular." This was an admirable exposition of British policy in the Near East and declared that, as the position of Turkey had been settled by the Powers of Europe in the Treaty of Paris, 1856, the signatories thereto had the right and the duty to see that no modifications of it should be made without their consent. Russia recognized that the circular meant either war or a conference, and the Berlin Congress (q.v.) resulted. Beaconsfield and Salisbury represented Great Britain at the congress.

The Gladstone campaign of 1880 brought the Liberals into office and Salisbury into opposition till 1885, when Gladstone was defeated on a budget resolution. In June, Salisbury formed his first ministry, taking the Foreign Office for himself. In February of the following year (1886) Gladstone came into power again. By July he had introduced his first Home Rule bill and had been defeated, giving place to the second Salisbury administration, the latter again combining within himself the offices of Premier and Foreign Secretary. During this administration, which lasted till 1892, several measures of importance were introduced; but Home Rule, once more placed at the head of the Liberal program, aroused, through Gladstone's influence, so wide an interest that the general elections of June 1892 once more swept the Conservatives from office and Gladstone returned with a majority of 40. Perhaps the most memorable achievement of Lord Salisbury's foreign policy was the Anglo-German agreement with regard to Africa (1890), by which the relations of Germany, Portugal and Great Britain in Africa were settled and «spheres of influence» were marked off. England obtained the protectorate of Zanzibar and gave Germany the island of Heligoland. When the second Home Rule bill was thrown out by the House of Lords, Gladstone relinquished the premiership to the Earl of Rosebery, who resigned in 1895. Salisbury then entered on his third and last premiership, from 2 July 1895 to 11 July 1902. He had to deal with the Armenian and Cretan questions, with the Chinese imbroglio, the Venezuelan boundary controversy and the South African War (1899–1902). After the 1900 elections, by which the government received a popular mandate to carry the war on «to a finish,» Lord Salisbury reconstructed his cabinet and handed the Foreign Office over to Lord Lansdowne. Salisbury withdrew from public life 11 July 1902 and was succeeded as Premier by his nephew, Mr. Arthur James Balfour (q.v.). Between 1895 and 1902 the leading figure in the government was the late Joseph Chamberlain, Colonial Secretary, a former bitter antagonist of Salisbury. Throughout his long public career of 47 years, the Marquis of Salisbury was a consistent Tory. He had many intellectual gifts; an extensive knowledge, a mastery of the English language, a mordant and effective style in debate and a singular mental clear-sightedness. He saw so clearly and stated so plainly the reasons against any particular course of action that he frequently seemed to stop the way to any action at all. On occasion, too, he asserted the claims of his country with such unflinching and rigid logic as to place the other side in a position of difficulty and almost of humiliation, though he was not prepared to follow up his words by deeds, and was quite ready to accept a compromise. He harbored a strong dislike and a mistrust of Germany; he regarded the ambitions of that country as a standing menace to England. In later years he attempted to bring about a better understanding with Germany, as well as with France and Russia. From the outset of the Spanish-American War he strongly set his face against the scheme of a European coalition in favor of Spain. Of a scientific bent of mind — he was an expert electrician and a keen student of chemistry — Lord Salisbury was entirely indifferent to public opinion and impatient of ceremonial and court functions. In his early career he rather mistrusted the masses, a sentiment gradually replaced in later years by an unswerving belief in the solid sense of his countrymen. He never played to the gallery or made flowery speeches. Yet he ultimately acquired the supreme confidence of both partisans and opponents, simply because he was above the political temptations of ordinary men.

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SALISBURY, Rollin D., American geologist: b. Spring Prairie, Wis., 17 Aug. 1858; d. Chicago, Ill., 15 Aug. 1922. He was graduated from Beloit College, Wisconsin, and taught in the academy of that institution in 1881–83. He accepted the chair of geology there in 1884, occupying it until 1891 with the exception of 1887–88, which he spent at the University of Heidelberg. He was professor of general and geographic geology in the University of Wisconsin from 1891–92 and in the latter year became professor of geographic geology in the University of Chicago, which position he held until his death. He was dean of the university colleges from 1894–96 and dean of the Ogden Graduate School of Science after 1899. From 1903 to 1919 he was head of the department of geography and from 1919 until his death, head of the department of geology. He was connected with the United States Geological Survey (glacial division) from 1882–94, and a geologist of the Survey thereafter. From 1891 to 1915 he was geologist in charge of Pleistocene geology of New Jersey. His works include 'Geography of Chicago and its Environs,' with W. C. Alden (1899); 'Geography of the Region about Devil's Lake and the Dalles of Wisconsin' with W. W. Atwood (1900); a three-volume treatise on 'Geology,' with Prof. T. C. Chamberlin; 'College Geology' and 'Introductory Geology,' with the same author; 'Physiography, Advanced Course'; two smaller works on physiography; 'Elements of Geography,' with Prof. H. H. Barrows and W. S. Tower, and 'Modern Geography,' with the same authors.

SALISBURY, formerly **FORT SALISBURY,** Africa, capital of Southern Rhodesia, in Mashonaland, 372 miles by rail from Beira on the eastern coast, and 298 miles by rail north of Buluwayo. Its two parts are known as the Causeway and Kopje, separated by an intervening space of about three-quarters of a mile. Municipal and government offices have been established; and there are several hospitals, a cathedral, stock exchange and other buildings. Causeway is the residential district and government headquarters; the Kopje, the business district. Gold and coal mines abound in the environs, and the plateau is suitable for agriculture. The increasing native and European population includes over 500 whites.

SALISBURY, Conn., town, Litchfield County, on the Housatonic River, and on the Philadelphia, Reading and New England Railroad, 63 miles northwest of Hartford. The town contains the villages of Salisbury, Lakeville, Lime Rock, Chapinville and Ore Hill. It was first settled about 1720 by Dutch from New York; New England settlers came to the town about 1740 and it was incorporated in 1741. The mining of the iron ore found in the vicinity soon became an important industry, and during the Revolutionary War much of the cannon, shot, etc., for the colonies was made at Salisbury. The iron mines continue to yield ore of excellent quality, and the town has several blast furnaces, also a cutlery factory, a railroad machine shop and a foundry. The region is hilly, and the township contains Bear Mountain, the highest elevation in the State. The Connecticut School for Imbeciles is located here; there is a public academy (high school), a public library, established by the Library Association in 1771; also Saint Austin's School, a Protestant Episcopal secondary school, Saint Mary's Convent, Hotchkiss School, Scoville Memorial Library. Pop. 3,522.

SALISBURY, or **NEW SARUM,** nū-sā'rŭm, England, a cathedral city, the capital of Wiltshire, 80 miles southwest of London, stands on the Avon at its confluence with several smaller branches. It is built in modern style, and the streams by which it is divided are crossed by bridges which connect the various sections of the town. Most conspicuous among the public buildings is the splendid cathedral, dating from 1220, one of the grandest and most interesting specimens of Gothic architecture in England. It is in the form of a double cross, with a graceful and exquisite interior and has a spire 404 feet high. The light and airy pillars and pilasters are of Purbeck shell marble. There is some stained glass, and many interesting old monuments. Within the spacious precincts of the cathedral are the episcopal palace, the deanery and other buildings. There are three parish churches in the town, besides a Roman Catholic chapel, an artistic structure. The market-place is a central wide open space, at the southeast corner of which stands the council-house, with a handsome Doric portico. Saint Nicholas Hospital and the Poultry Cross are ancient edifices of some architectural merit. Educational and charitable institutions are numerous. Salisbury was formerly renowned for its manufactures of woolens and cutlery, but is at present chiefly important as a distributing centre. Pop. 21,476.

SALISBURY, Md., village, county-seat of Wicomico County, on the Wicomico River, and on the Baltimore, Chesapeake and Atlantic, and the New York, Philadelphia and Norfolk railroads, 84 miles southeast of Baltimore. It is in an agricultural and lumbering region, and has a large trade, exporting chiefly grain, fruit, vegetables and lumber. The most important manufacturing establishment is a yellow pine box factory, the largest in the United States; there are also saw and planing mills, flour mills and a wool carding mill. There are (1917) two national banks, with combined capital of $180,000 and resources of $1,633,985. The village has a public high school established in 1872. Pop. about (1920) 7,502.

SALISBURY, N. C., city, county-seat of Rowan County, on the Southern railroad, 130 miles west of Raleigh. It was originally settled by English churchmen from Salisbury, England, and was named for that city; it was selected as the county-seat as early as 1753, but was not chartered until 1770. It is the centre of an agricultural and mining region; and contains tobacco-factories, iron foundries, machine shops, railroad workshops, tanneries and cotton and woolen mills. There are (1917) two national banks, with combined capital of $150,000 and resources of $1,737,757, and a State bank. The city has a public high school, established in 1899; and it is also the seat of Livingston College, established in 1882, by the African Methodist Episcopal Church, for the education of the colored race, and the State Colored Normal School. Pop. (1920) 13,884.

SALISBURY PLAIN, England, in the county of Wilts, is a high rolling plain of considerable extent and of chalky formation, from which diverage the majority of the hill chains of central and southern England. The name applies actually to the district lying between Salisbury and Devizes, although the plain may be said to extend both north and south of Salisbury. It is about 20 miles long, by 14 broad, the greater length being from north to south. Eight miles north of Salisbury upon this plain stands the historical and desolate Stonehenge (q.v.).

SALISHAN (sā'lĭsh-an) **INDIANS** (Okinagan, *sälst,* «people»), referring specifically to the Flathead Indians, hence Salish, or Selish, of which the stock name is an adaptation. A linguistic stock of North American Indians comprising a large number of tribes or bands, most of them insignificant in numbers, the original habitat of which included an isolated area on the Oregon Coast, occupied by the Tillamook and Nestucca, who were separated from their congeners to the north by Chinookan and Athapascan tribes; then beginning on the northern coast of Shoalwater Bay, Salishan tribes occupied the entire northwestern part of Washington, including the Puget Sound region, excepting small tracts about Cape Flattery and southward, and near Port Townsend, which were held by Chimakuan tribes. Eastern Vancouver Islands was also inhabited by Salishan tribes, while the greater part of their territory lay on the mainland opposite, including much of the upper Columbia. On the south they were hemmed in mainly by Shahaptian tribes; on the east they dwelt to a little beyond the Arrow lakes and their feeder, one of the extreme northern forks of the Columbia, where they were met by Lewis and Clark in 1804. On the northeast Salishan territory extended to about lat. 53°. In the northwest the main area did not reach Chilcat River, but the Bellacoola occupied an isolated area on Dean Inlet, Burke Channel and Bellacoola River, British Columbia. The Salashan tribes were successively visited by Juan de Fuca (1592), by the Spanish navigators who later explored the coast, by George Vancouver (1792–94) and by Lewis and Clark (1804–06), who gave the first

definite information regarding them. The fur-traders penetrated their country early in the 19th century and while Astoria, at the mouth of the Columbia, was not founded within their immediate territory, its establishment formed the beginning of the change in the primitive condition of the Salishan and the surrounding tribes which perhaps reached its climax soon after the establishment of the trading post at Victoria, British Columbia., in 1843. In their habits and customs the Salishan Indians may be divided into the coast and the interior groups. Among the former, at least, the gentile system is recognized, descent being in the male line; their houses are long communal structures, built of puncheons and designed to accommodate several families, each with its own fire. Sea products formed their chief sustenance; the canoe played an important part in their daily life; slavery was practised, and the *potlatch,* a curious institution which consisted of elaborate feasting and the distribution of personal property, held sway to such an extent as frequently to impoverish the most progressive members of the tribe. The interior Salishan tribes hunted and fished for salmon in the many streams that drain their former territory. Their houses, unlike those of the coast, were conical and constructed of poles covered with grass, pine-needles, bark and earth. The custom of head-flattening was practised particularly among the coast Salish, but, strange as it may seem, this habit did not prevail among those members of the stock now designated by the name «Flat-heads.» There are many tribes or sub-tribes of the Salishan stock in Washington, Montana and British Columbia, numbering in all about 18,500 individuals, of whom about 8,000 are within the limits of the United States. The principal Salishan tribes within Canadian territory are the Lillovet, Okinagan, Thompson Indians and Lhuswap. Of the population of the Canadian divisions of the stock little reliable information is obtainable, as many tribes or tribal divisions are assembled on each of several reservations, only the combined population of which is known. These are distributed as follows: Fraser River Agency, about 5,000; Kamloop's Agency, about 2,600; Cowichan Agency, about 1,850; Okinagan Agency, 950; Williams Lake Agency, 1,900; Kootenay Agency, 50. The principal Salishan tribes or bands on reservations in the United States are:

Colville Agency, Washington.— Cœur d'Alène (Skitsuish), 474; Colville, 296; Kalispel or Pend d'Oreilles, 150; Lake or Senijextee, 307; Spokane, 653; Okinagan, 575; Sanpoil and Nespelim, 400, making a total of 12,350.

Puyallup Agency, Washington.— Chehalis, 156; Georgetown, Humptulip, Quaitso and Quinaiel, 324; Nisqualli, 107; Puyallup, 536; Skallam or Clallam, 317; Skokomish, 165; Squaxon, 118.

Tulalip Agency, Washington.— Lummi, 340; Muckleshoot (collective), 148; Port Madison, 150; Swinomish, 313; Tulalip, 488.

At Large in Washington.— Nooksak, 200; Piskwans or Wenatchi, 166.

Flathead Agency, Montana.— Charlot's band of Flatheads, 157; Confederated Flatheads, Pend d'Oreilles and Kootenai, 1,310; Lower Kalispel or Pend d'Oreilles, 53; Spokan, 77.

Since the above statistics were published many of the younger Indians have left the reservations and gone into civilized life, which has reduced those remaining on the various agencies to over 10,000 in Canada and over 8,000 in the United States. Consult Curtis, E. S., 'Indian Days of the Long Ago' (Yonkers 1914); Farrand, L., 'Basket Designs of the Salish Indians' (New York 1900); Trey, A., 'Von Salis-Seervis' (Frauenfeld 1889); Hill-Tout, C., 'British North America' (London 1907); Hodge, 'Handbook of American Indians' (Washington 1910); Pöder, G. W., 'Der Dichter Johann Gaudenz von Salis-Seervis' (Saint Gall 1863); Smet, P. J. de, 'Letters and Sketches' (Philadelphia 1843).

SALIVA. See Salivary Glands.

SALIVARY GLANDS, the glands which secrete saliva, the fluid of the mouth, or spittle. By means of these secretions the food in the mouth is brought to a pulpy state, and through the chemical action of saliva certain changes are effected in the constituents of the food. In man the salivary glands comprise three pairs, as in the mammalian class generally. Of these the largest is the parotid gland, lying in front of the ear, before the mastoid process of the temporal bone, and behind the ramus of the lower jaw. Its duct is the parotid duct, or duct of Steno. It opens into the mouth opposite the second upper premolar tooth. This gland measures from two and one-half to three inches in length, and is supplied with blood by branches from the main trunk of the external carotid artery, from the temporal, facial and other blood-vessels. The nerve supply is chiefly derived from the vegetative nervous system. The submaxillary gland, next in size, is in the lower portion of the lower jaw, above the digastric muscle. Its duct (Wharton's duct) is about two inches long, and its arteries and veins are derived from the facial and lingual vessels. The third distinct salivary gland, the sublingual, is still smaller, and is situated on the floor of the mouth, beneath the front part of the tongue. It is from one and one-half to two inches through its long axis. Its numerous ducts open on the floor of the mouth by many minute apertures. The excretory ducts of subsidiary glands in the mouth open simply on the mucous membrane of the mouth. The minute or microscopic structures of the salivary glands are composed of lobes in turn composed of lobules, each of which contains a small branch of the main duct of the gland, the subdivisions of which ultimately terminate in minute vesicles or sacs, known as acini. The salivary fluid as found in the mouth is usually mixed with the mucus secreted by the mucous or lining membrane of the mouth, and is thus rendered of viscid consistence.

Salivary glands are absent in some mammals, as whales; in some reptiles, as crocodiles; and in most fishes. In mammals alone salivary glands are present of the definite structure seen in man; but in many reptiles, as in serpents, definite (buccal) glands exist, within the inside margin of the jaws. In birds the submaxillary glands may be of large size; and in some forms, as woodpeckers, the saliva may be normally of a viscid consistence, adapted for smearing the tongue, and for thus aiding in the capture of insect-prey. Swifts, as is well known, secrete in their salivary glands a glutinous substance of which in great part, often almost wholly, they build their nests. (See Birds' Nests, Edible).

When first secreted, saliva gives an alkaline reaction. During digestion this alkaline condition persists. During fasting saliva gives a neutral reaction, as also when slowly secreted, its alkalinity then being neutralized by the acid of the mucus of the mouth. Microscopically examined, saliva shows minute solid particles, probably derived from the secreting structures; and when mixed with the fluids of the mouth it contains also epithelial scales from the mouth and tongue, and mucus corpuscles, mostly from the tonsils. Freed from these, the saliva is a fluid either colorless or bluish-gray.

During mastication the flow of saliva is greatly accelerated, the presence of food in the mouth acting as the stimulus to its secretion; and different foods affect the secretion in different degrees; while mental impressions, without the presence of food, will cause saliva to flow, or will «make the mouth water.» Under the action of different branches of the vegetative nervous system the secretion may be thin and watery, or thick. It is constantly subject to mental impressions, such as fear and hate and haste and fatigue. The functions or uses of saliva are both mechanical and chemical. It acts mechanically to incorporate and mix the food in the mouth, to render swallowing easier and to keep the tongue and mouth moist, so aiding articulation. (See Digestion).

The secretion of the pancreas markedly resembles that of the salivary glands in chemical composition, and exerts an action on the food similar in many respects, and in those forms in which salivary glands may be wanting or undeveloped the pancreatic secretion may supply the place of the salivary fluid. This action is chiefly confined to a slight action upon starches, partly converting them to sugars. Hence the slight sweetness of bread when chewed. Among invertebrates salivary glands are usually well represented. Insects and other *Annulosa* and the generality of mollusks thus possess definite structures devoted to the secretion of the salivary fluid.

Calculous concretions (salivary calculi) may form in the salivary glands, and may cause obstruction of their ducts, and necessitate the performance of an operation for their removal. Saliva would appear to become abnormal and to constitute a source of infection in hydrophobia or rabies; and syphilis is said to have been transmitted through this medium. Occasionally the elements of urine have been present in saliva — forming the so-called urinary saliva of pathologists — in consequence of diseased conditions, on the removal of which the secretion became restored to its normal composition. Milky saliva, so named from the presence of milk constituents, has also been described as a condition occurring in some parturient women. See Higier, 'Vegetative Neurology' (1919).

SALIVATION, or **PTYALISM,** a superabundant secretion of saliva, sometimes occurring in disease, but usually, in medicine, either determined locally by the use of masticating irritants or by drugs which act upon the whole system, especially by mercurial preparations. In the last case it is accompanied by a coppery taste and by the swelling of the gums, which become of a pale rose color, except close to the teeth, where they are of a deeper red. The breath is «mercurial» and very fetid, and the teeth seem elongated and loosened. If the use of mercury is continued the swelling of the gums increases; it affects the tongue and all the salivary organs; finally, the mucous membrane is studded with small superficial ulcers covered with a white skin. Salivation is ordinarily anticipated, during mercurial treatment, by maintaining cutaneous perspiration by means of warm baths, friction and exercise. If salivation is persistent notwithstanding the use of these means, emollient gargles containing more or less of opium are used, and on the abatement of the salivation they are replaced by astringent tonics. Salivation was formerly frequent, but has become rare through modifications in mercurial treatment.

SALIX, one of the two genera of the family *Salicaceæ* (the other being *Populus*). The species are diœcious trees and shrubs, inhabiting principally the northern hemisphere and the temperate and arctic zones, and very abundant therein, especially along the banks of streams and ponds. The leaves are alternate and narrow and the small flowers, reduced to a disc bearing either stamens or pistil, according to sex, are gathered into unisexual catkins, each flower subtended by a bract. These catkins usually appear before the leaves, and are fertilized by insects, having nectaries for their attraction, the male flowers, moreover, showing large bright-colored anthers and a honey-like odor. The two-valved capsules contain numerous seeds, crowned by dense plumes of soft hairs, which enable them to float off on the wind and be disseminated by it. There are described nearly 300 species of *Salix,* which have been broadly classified as Sallows, Osiers and Willows.

Many fossil forms of *Salix* have been found. Salicin is a crystalline glucoside obtained from the bark of various species of *Salix,* and is one of the sources of salicylic acid, for which it is sometimes substituted in medical practice. See also Willow.

SALLEE, sā-lē', **SALI, SLA,** or **SULLEE,** Morocco, a seaport on the western coast of the Atlantic, 106 miles west of Fez, at the mouth of the Buregreb, formerly the great centre of Moorish piracy, immense depredations being committed from it upon European commerce. It is particularly noted for the carpets which it produces, of fine texture and bright colors. The river, which formerly admitted large vessels, is now choked up with sand. On the opposite side of the river stands Rabat (q.v.), called often New Sallee. Pop. of Sallee about 17,360.

SALLUST, săl'ŭst (Gaius Sallustius Crispus), Roman historian: b. Amiternum, in the Sabine district, 1 Oct. 86 B.C. (668 A.U.C.); d. Rome, 13 May 35 B.C. (719 A.U.C.) or 34 B.C. (720 A.U.C). He held the offices of quæstor and *tribunus plebis,* attained senatorial rank, was of the Cæsarian faction in the Civil War, went to the war in Africa as prætor in 47 B.C. and after the close of the struggle at Thapsus was made commander in Africa with title of proconsul. Having returned to Rome in 45 B.C., he formed the extensive gardens celebrated as

the *herti Sallustiani.* The chief remains of his historical works are two monographs, one on the conspiracy of Catiline ('De Conjuratione Catilinæ'), the other on the war against Jugurtha ('De Bello Jugurthino'). The 'Catiline' was prepared more largely from literary sources than from the original documents which appear to have been accessible; hence it is vague and inaccurate as to chronology and fact. It aims rather at the explanation of motive and general development, and this it expresses with frequently epigrammatic neatness, but at times so sententiously as to be obscure and involved. The 'Jugurtha,' which commemorates the five years' war between the Romans and Jugurtha, the king of Numidia, or from 111 B.C. to 106 B.C., exhibits much the same features, but is based on a more thorough research and is more finished and even in style. Of Sallust's largest work, the five books of 'Historiæ,' there are extant only four speeches, two letters and a few fragments. This work is believed to have been planned to describe the events occurring between Sallust's death, 78 B.C. and the year of Cicero's prætorship, 66. There are editions of the 'Catiline' by Schmalz (1886), Thomas (1884), Cook (1884) and Turner (1887); of the 'Jugurtha' by Thomas (1887); Schmalz (1886) and Brooks (1885); Frazer (1890), Merivale (1858), and Capes (1884). There is an English version by Pollard (1882).

SALLY-LUNN, the name given a popular teacake; so called from Sally Lunn, a pastry cook of Bath, England, who used to cry them about in a basket at the close of the 18th century. Dalmer composed a long-popular song about the cakes.

SALM-SALM, zälm-zälm, **Felix,** German soldier: b. Anhalt, Prussia, 25 Dec. 1828; d. Gravelotte, Alsace, 18 Aug. 1870. He was the youngest son of the reigning prince Salm-Salm, and became an officer in the Prussian army, but later joined the Austrian army. In 1861 he came to the United States and served during the Civil War as colonel of the 68th New York regiment. He next offered his services to Maximilian, of Mexico, whose fortunes he followed as aide-de-camp and chief of the imperial household, until the death of that emperor, when he again entered the service of Prussia. He was killed in the battle of Gravelotte during the Franco-Prussian War. His wife, AGNES LECLERQ (b. Baltimore, Md., 25 Dec. 1840; d. Karlsruhe, Germany, 21 Dec. 1912), an American actress, whom he married in 1862, accompanied him upon all his subsequent campaigns, and became known for her deeds of bravery and ministrations to the sick and wounded, especially during the Franco-Prussian War. Her experiences in Mexico and other fortunes of war are told by her husband in his book 'My Diary in Mexico in 1867.' She published 'Ten Years of My Life' (1875).

SALMAGUNDI, a dish of minced meat, seasoned with pickled cabbage, eggs, anchovies, olive oil, vinegar, pepper and similar ingredients. In an applied sense the word means pot-pourri, a medley, a miscellany.

SALMAGUNDI CLUB, a famous club of artists in New York, organized in 1871. It is now located at 47 Fifth Avenue, New York. The old club house in West 12th Street, New York, was formerly the residence of Rogers, the sculptor.

SALMASIUS, säl-mā'shi-ŭs, **Claudius** (Latinized name of CLAUDE DE SAUMAISE), French scholar: b. Sémus-en-Auxois, 15 April 1588; d. Spa, 3 Sept. 1653. His father, a learned man, instructed him in the ancient languages, and then sent him to Paris to study philosophy. His edition of 'Florus,' published in 1609, is a remarkable proof of his early erudition. In 1606 he went to Heidelberg to study law under the celebrated Gothofredus (Godefroi). On his return to France in 1610 he began to practise law, but soon withdrew to devote his whole time to critical labors and learned controversies. His mother, a Calvinist, had educated him in Protestant principles; and in 1623 he married a Protestant. Several years later he passed some time at the country-seat of his father-in-law, near Paris, where he completed his great labor on Pliny and Solinus. In 1629 his father was desirous of transferring to him his own place as magistrate, but as he openly professed Calvinism, the keeper of the seals, Marillac, refused to sanction the nomination. In 1651 he accepted the professorship which had been held by Scaliger at the University of Leyden. His friends made several attempts to recall him to France, and Cardinal Richelieu offered him a pension on condition of his writing a history of his ministry; but Salmasius declined all these offers. In 1649 Charles II of England induced him to write a defense of his father ('Defensio regia pro Carolo I'), which was answered by Milton's 'Defensio pro Populo Anglicano.' (See MILTON). The 'Defensio Regia' offended his republican patrons in Holland, and he accepted the invitation of Queen Christina to visit Sweden (1650). But the climate was so unfavorable to his health that he returned to Holland the following year. The most important of his works are 'Plinianæ Exercitationes in Solinum' (1629); 'Scriptores Historiæ Augustæ'; 'De Mutuo'; 'De Usuris' (1638); 'De Modo Usurarum' (1639); 'De Fœnore Trapezitico'; 'De Re Militari Romanorum'; 'De Re Hellenistica'; 'Observationes in Jus Atticum et Romanum' (1645). Besides the classical and many modern languages, he was acquainted with Hebrew, Chaldaic, Arabic, Persian and Coptic. A collection of his 'Letters, to which his 'Life' is prefixed, was published after his death by Antony Clement (Leyden 1656).

SALMON, Daniel Elmer, American veterinarian: b. Mount Olive, N. J., 23 July 1850; d. 20 Aug. 1914. He was educated at the universities of Cornell and Paris. In 1879–84 he was investigator for the United States Department of Agriculture, after which he organized the Bureau of Animal Husbandry, acting as its chief in 1884–1906. He was head of the department of veterinary science at the University of Montevideo, Uruguay, in 1906–12. In 1898 he was president of the United States Veterinary Association. Salmon made many important investigations concerning communicable diseases of cattle and was responsible for much of the advancement in recent years of the care and inspection of cattle and the prevention of disease among them.

SALMON, George, Irish mathematician and theologian: b. Dublin, Ireland, 25 Sept. 1819; d. there, 22 Jan. 1904. He was educated at Trinity College, Dublin, took orders in the Anglican Church and was professor of divinity at Dublin University in 1866–88. He was president of the mathematics and physics section of the British Association in 1878, and from 1888 till his death was provost of Trinity College, Dublin. He published 'Conic Sections'; 'Geometry of Three Dimensions'; 'The Reign of Law' (1873); 'Non-miraculous Christianity' (1881); 'Gnosticism and Agnosticism' (1887); 'Infallibility of the Church' (1888); 'Introduction to the New Testament' (4th ed., 1890); 'Cathedral and University Sermons' (1900), etc.

SALMON, a fish of the family *Salmonidæ,* regarded as the highest type of the true or teleostean fishes. The eminent American ichthyologist, Dr. D. S. Jordan, who has made a special study of this group, speaks of it as follows: "As now restricted, this is no longer one of the large families of fishes, but in beauty, activity, gaminess and quality as food, and even in size of individuals, different members of the group stand easily with the first among fishes. The *Salmonidæ* are confined to the northern regions, and north of about 40° N., are everywhere abundant where suitable waters occur. Some of the species, especially the larger ones, are marine and anadromous, living and growing in the sea, and entering fresh waters to spawn. Still others live in running brooks, entering lakes or the sea as occasion serves, but not habitually doing so. Others again are lake fishes, approaching the shore, or entering brooks in the spawning season, at other times retiring to waters of considerable depth. Some of them are active, voracious and gamy, while others are comparatively defenseless and will not take the hook. The large size of the eggs and their lack of adhesiveness, with the ease by which the eggs may be impregnated, render the salmon and trout especially adapted for artificial culture. The *Salmonidæ* are of comparatively recent evolution, none of them occurring as fossils, unless it be in recent deposits. The instability of the specific forms and the lack of sharply defined specific characters may be in part attributed to their recent origin, as Dr. Gunther has suggested."

The family includes the American genera *Coregonus* (whitefish), *Argyrosomus* (ciscoes), *Stenodus* (inconnus), *Cristivomer* (lake-trout), *Salvelinus* (chars or "trout"), *Oncorhynchus* (Pacific salmon), and *Salmo* (Atlantic salmon, and salmon-trout).

Atlantic Salmon.— The body of the Atlantic salmon (*Salmo salar*), native to the rivers of both sides of the North Atlantic, is moderately elongate and but little compressed; the greatest depth is about one-fourth the total length without the caudal fin. The length of the head is about equal to the depth of the body. The mouth is of moderate size. The scales are comparatively large and number about 120 in the lateral line. The dorsal fin has 11 rays and the anal, nine rays. The color, like the form, varies with sex, age, food and condition. The adult is brownish above and silvery on the sides, with numerous small black spots often X or XX shaped, on the head, body and fins, and with red patches along the sides of the male. Young salmon (parrs) have about 11 dusky cross-bars, besides black and red spots. Weight 15 to 40 pounds.

Its original natural range in America stretched from Greenland to Long Island Sound.

The vast abundance of salmon was one of New England's chief recommendations to immigration in colonial days. The Merrimac is reported to have been so filled with them during the spring migration that they sometimes crowded those near the banks out on dry land. Even as late as 1783 Peters reported in his 'History of Connecticut' that the "shad, bass and salmon more than half supported the province." There is no good reason to suppose that they did not originally run in the Hudson, although direct evidence that they did so in abundance is lacking. DeKay mentions that one was taken in August 1840, near Troy, N. Y., weighing 40 pounds. Long before that year, however, the New York market had ceased to be supplied from the Connecticut, and had begun to bring salmon from the Kennebec, packed in ice. In the Saint Lawrence, however, few if any salmon entering the river from the sea ever ascended as far as Lake Ontario, and the salmon inhabiting that lake and its tributaries have always, as a rule, made the lake their sea, and the limit of their downward migrations. The reason for the decline was everywhere the same — over-fishing in the rivers with seines, and the damming of the upper streams for milling or other purposes. Although Peters had recorded that in 1783 salmon "fill the Connecticut River for many days, and no finite being can number them," the Rev. D. D. Field stated in 1819 that they had scarcely been seen there for "15 or 20 years."

In respect to the habits and feeding of the salmon Dr. G. Brown Goode has written at great length. He remarks that most of the tribe are peculiarly fresh-water fishes, though several share the sea-dwelling habit, and others, like the brook-trout, descend into salt water when not prevented by barriers of temperature. "I am inclined to the view that the natural habitat of the salmon is in the fresh waters, the more so since there are so many instances . . . where it has been confined for years in lakes without apparent detriment. . . . The salmon while it remains in the sea, or in the brackish estuaries, takes particular delight in feeding on crustaceans and their eggs, small shrimps and young crabs. When in the rivers they eat but little, though they are at times eager enough for food, as testify their voracious rushes at the angler's flyhook. The absenteeism of the salmon is due principally to the dearth of desirable food in the rivers. The young fish stay in fresh water for one and frequently two years. When they pass down to the sea they weigh but a few ounces. They find congenial food and begin to grow rapidly. The broad world of ocean affords them new opportunities for adventure and self-advancement, and it is only when summoned by the duties of family life that they return within the narrow limits of the old home. When salmon live in the lakes they prey upon minnows and other small fishes, but those of the sea delight also in small crustaceans and their eggs, to which they owe the vivid color of their flesh. The habits of successive generations become hereditary traits."

It is as an adult, four years or a little more old, that the salmon enters the rivers and work their way toward their head. They have been for two or two and a half years in the sea, where and how living is little known; but the probability is that they do not go very far from the mouth of the river in which they were born. They enter as soon in the spring as the water has reached a moderate degree of warmth, and therefore appear in southern rivers much earlier than in northern ones. They are in magnificent condition, and make their way upstream with extraordinary persistence and force, overcoming swift rapids, climbing cataracts and leaping unbroken falls as much as 12 feet high; but only the strongest can accomplish so great a feat, and sometimes only after repeated efforts. It is during this early advance that the angler seeks the streams where they are running and throws his line for the grandest sport afforded by fly-fishing in fresh waters. Having reached, as near as time or circumstances permit, to the sources of the stream the eggs are poured out in vast quantities by the females, and simultaneously the males void their milt, so that impregnation takes place at once. This takes place in our rivers late in October or in November. The development of the embryo proceeds for a time, but soon is checked by the winter cold, so that it does not burst the shell of the egg until the next April or May.

At this time the embryo salmon has a slender half-transparent trunk, less than an inch in length, carrying, suspended beneath, an immense ovoid sac — the "yolk-sac"; for about six weeks after hatching it hides in crevices among stones, keeping up an incessant fanning with its pectoral fins. During this period it takes no food, but is supported and nourished by the yolk-sac, the substance of which is gradually absorbed into the fest of the body, and not until the sac has nearly disappeared does the salmon really look like a fish and begin to seize and swallow food. It now puts on a mottled coat, with several heavy dark bars across its sides, and bright red spots, larger and fewer than those of a trout, and looks therefore very unlike the adult salmon but much like a young trout. In this stage it is termed, in Scotland and England, a "parr," and it was formerly thought to be a wholly different species from salmon.

The parr stage lasts a year or two in British rivers, and the few observations made in America indicate that it is more likely two years than one in our rivers. The parr, at first but little over an inch in length, is provided with good teeth and a good appetite, and beginning to feed at a season of the year when the water is almost crowded with small insects and other more minute creatures, it grows rapidly, probably increasing its weight 30 or 40 times the first summer. In two years it reaches the length of six or eight inches, and its bright red spots and dark bars have given place to a silvery coat like the adult salmon. It is now termed a "smolt" and is ready to go to sea, which it does with little delay, and passes out beyond the range of man's observation, but to a region where it finds a rich feeding-ground and rapidly increases in size. In northern rivers, those of New Brunswick and beyond, as in those of northern Europe, the salmon returns from the sea when it has attained a weight of two to six pounds, and is then termed a "grilse." In the rivers of Canada, in general, grilse occur in great numbers, coming in from the sea at a later date than the adults, but ascending like them to the upper waters, mingling freely with them, rising to the same fly, and caught in the same weirs. In our rivers grilse are seldom seen; yet it by no means follows from this that our salmon do not pass through the same phases of growth, or that the growth is more rapid, but merely that when in the grilse stage they generally lack the instinct that impels their more northern relatives to seek fresh water.

Of the characteristics of grilse, as ascertained in the rivers they frequent, it will be sufficient to say that they exhibit to a great degree the characteristics of the adult; that the main external differences are a shorter head, slenderer form, and a difference in the color and markings; that they are remarkably active and agile, leaping to great heights: that the male is sexually well developed and mates with the adult, but that the female is immature, and that, like the adult, they abstain from food and consequently lose flesh during their stay in fresh water.

Pacific Salmon.— There are five species of salmon on the Pacific Coast which belong to the genus *Oncorhynchus,* namely, the chinook or quinnat salmon (*O. tschawytscha*), the red or blueback salmon (*O. nerka*), the humpback salmon (*O. gorbuscha*), the silver salmon (*O. kisutch,* and the dog salmon (*O. keta*). The features which separate the Pacific salmons from the Atlantic salmon are not marked, and consist chiefly in a larger number of rays in the anal fin, and more branchiostegals, gillrakers, and pyloric cœca.

The characters noted in the following key will usually be sufficient to distinguish the different species of Pacific salmon:

Quinnat Salmon.— Scales in longitudinal series from 135 to 155, averaging about 145; pyloric cœca 140 to 185; gillrakers comparatively short and usually 23 in number, 9 being above the angle; rays in anal fin 16; branchiostegals 15 to 19. Body robust; head conic; eye small; caudal fin deeply forked. Color above dusky, sometimes with bluish or greenish tinge; sides and belly silvery; head dark with metallic lustre; back and the dorsal and caudal fins with numerous round black spots.

Blueback Salmon.— Scales in longitudinal series about 130; pyloric cœca 75 to 95; gillrakers comparatively long and 32 to 40 in number; rays in anal fin 14 to 16; branchiostegals 13 to 15. Body rather slender; caudal fin much forked; anal and dorsal fins low. Color, above bright blue, sides silvery, no spots.

Humpback Salmon.— Scales very small, 210 to 240 in longitudinal series; pyloric cœca very slender, about 180 in number; gillrakers short, about 28, 13 being above angle; anal rays 15; branchiostegals 11 or 12. Color bluish above, silvery on sides; hind part of back, adipose fin, and tail with numerous black spots, largest and of oblong form on tail.

Silver Salmon.— Scales large, 125 to 135 in longitudinal series; pyloric cœca comparatively few and large, 45 to 80 in number; gillrakers long and slender, 23 in number, 13 below angle; anal rays 13 or 14; branchiostegals 13 or 14. Body long; head short, conic; snout blunt; eye small; fins small, caudal deeply forked. Color bluish green, sides silvery, finely punctulated; spots few and obscure on head, back dorsal, adipose dorsal, and upper rays of caudal.

Dog Salmon.— Scales of medium size, 138 to 155 in lateral line; pyloric cœca 140 to 185; gillrakers short and few, 9 above and 15 below angle; 13 or 14 rays in anal fin; branchiostegals 13 or 14. Form of quinnat, but head longer and more depressed. Dusky above and on head, paler on sides; very fine spots on back and sides, often wanting; tail plain dusky or finely spotted, with black edge; other fins blackish.

These salmons are the most important group of fishes entering the rivers of North America. The steelhead (*Salmo gairdneri*), technically a trout, but popularly regarded as a salmon, also inhabits the waters of the Pacific coast and adds to the importance of the salmon tribe.

In recent years the annual catch of salmon in the Pacific States and Alaska has been over 200,000,000 pounds. In 1920 the quantity of salmon canned was 4,429,463 cases of 48 one-pound cans. The weight of the fresh fish represented by this pack together with the large quantities sold, fresh, salted and smoked, was about 350,000,000 pounds, with a value, as placed on the market, of over $35,000,000.

The quinnat is known in various parts of its range as Chinook, king, Columbia, Sacramento or tyee salmon, and is the most important of these salmons. It is not only superior in food qualities, but attains a vastly larger size, has a wider geographical range and a greater commercial value. When fresh from the ocean it is a very handsome, well-formed fish, greatly resembling the Atlantic salmon, although less symmetrical and graceful. It is of a uniform rich red color, becoming paler or streaked upon the approach of the spawning season. Its value for canning purposes is largely enhanced by the persistence of the red color of the meat after cooking. In size no other salmon in the world compares with it. In the Yukon River, Alaska, it reaches a weight of over 100 pounds. Farther south, it runs smaller, although in the Sacramento individuals weighing 50 or 60 pounds are not rare; 22 pounds is a fair average weight in the Columbia River and 16 pounds in the Sacramento. Its known range is practically from Monterey Bay (latitude 36½) to the Yukon River, but it probably ranges farther north. While in the sea, quinnat salmon probably do not wander very far from the mouths of the rivers they have left, and for this reason usually return to spawn in the rivers in which they were hatched. They prefer the larger rivers, like the Sacramento, the Columbia, the Nushagak and Yukon. They are very persistent in ascending the rivers to spawn, and have been seen crowding up the rivulets which form the headwaters of the Sacramento until nearly half their bodies were exposed to the air. No matter how far the headwaters of a river are from the ocean, some of the salmon will press forward until stopped by impassable obstructions or water too shallow for them to swim in. On reaching the headwaters they remain for a week or two before proceeding to the spawning grounds. Their rate of progress varies with the season, and probably depends to a great extent on the rainfall and the state of the river, rain, roily water or high water always hastening their progress.

When they first come from the ocean the sexes are almost identical in appearance, but as the time for spawning approaches a difference is noticed between the males and the females, which during the spawning season becomes more marked. The fully developed ova of the female give her a round, plump appearance, while the male grows very thin. His head flattens, the upper jaw curves like a hook over the lower, the eyes become sunken; large, powerful, white, dog-like teeth appear on both jaws and the fish acquires a gaunt and savage appearance. As soon as they reach fresh water their appetites grow less, their throats begin to narrow, and their stomachs to shrink. This does not at first entirely prevent them from feeding, but it changes them enough to enable them to overcome the temptation to return to their well-stocked feeding-grounds in the ocean, and the longer they remain in fresh water the greater are the changes, and the desire to turn back for food is correspondingly lessened. This change comes about gradually, increasing day by day from the time they leave tidewater until at the near approach of the spawning season their throats and stomachs become entirely incapacitated for receiving food, and the desire and ability to feed leave them entirely. The great reserve of flesh and blood which they bring with them from the ocean enables them to keep the vital organs active until their mission up the fresh-water streams is accomplished.

Quinnat salmon, like all the Pacific salmon, do not return to the sea, but die on or near their spawning grounds. After spawning they rapidly deteriorate, the flesh shades off to a light, dirty pink and they become foul, diseased and much emaciated. Their scales are wholly absorbed in the skin, which is of a dark olive or black hue, and blotches of fungus appear on their heads and bodies, and in various places are long white patches where the skin is partly worn off. Their fins and tails become badly mutilated, and in a short time they die exhausted.

The spawning season of the quinnat varies in different rivers and, considering the entire coast, lasts at least six months. In July the summer run is spawning at the headwaters of the McCloud and Sacramento rivers in California; in August and September, farther down these rivers. In October the fall run has begun in the McCloud and below, and this run continues spawning through November into December. In the Columbia the spawning begins at the headwaters in June; at Clackamas, 125 miles from the mouth of the river, it begins about the middle of September and continues until November. A few days before they are ready to spawn the salmon hollow out elongated cavities with their heads and tails in the gravel beds of the river where there is some current, and here in due time the eggs and milt are deposited. The eggs drift into the crevices in the pile of stones thrown up below the hollow, sink to the bottom, and remain in that protected position during incubation; here, also, the young remain until the umbilical sac is absorbed. The eggs and young are liable to destruction by freshets, but are comparatively safe from other injurious influences. The quinnat is not so prolific as the Atlantic salmon, 300 or 400 eggs to each pound weight of the parent fish being a fair average.

As the salmon ascend the rivers they are caught by gill nets, fyke nets, pounds, weirs, seines, wheels and other devices, but in the Sacramento and Columbia the greater numbers are caught with gill nets drifting with the current or tide as they head upstream. In the rivers they are comparatively safe from enemies except otters, ospreys and fishers, but immense numbers are destroyed at the mouths of the streams by seals and sea-lions. The quinnat has been introduced into Japan, Australia, New Zealand and Europe, but efforts to acclimatize it on the Atlantic Coast of the United States have so far been unsuccessful.

Considering the entire west coast the blueback salmon (*O. merka*) is probably more numerous than all the other salmons combined. It is known in different regions as blueback, redfish, red salmon, Fraser River salmon and sock-eye or saw-qui. It ranks next to the chinook in commercial value, being especially important in the Columbia and Fraser rivers and in Alaska. For canning purposes it is but little inferior to the chinook, the color of the flesh being a rich red, which persists after canning. Large quantities are canned in British Columbia and in Alaska, particularly on Kadiak Island, and its commercial importance to that territory is indicated by the fact that nearly half of the entire salmon pack of the world comes from Alaska and the majority of the fish there canned are of this species. Comparatively few red salmon are sold fresh in the United States. It is next to the smallest of the salmons, the maximum weight being about 15 pounds, but it rarely weighs over eight pounds and the average is scarcely five pounds. In various lakes this fish weighs only half a pound when mature, and is called the little redfish. It ranges from Humboldt Bay, California, to the far north, but in general it ascends only those rivers which rise in cold, snow-fed lakes. Except in the breeding season the color of this fish is a clear bright blue above, with silvery sides and belly. At the spawning period the back and sides become red, and the male develops an extravagantly hooked upper jaw.

The humpback salmon is the smallest of the Pacific salmons; its average weight is only five pounds, and it rarely reaches 10 pounds. Its range is from San Francisco probably as far north as the Mackenzie River, and it is also common on the Asiatic Coast. In food qualities the fresh-run humpback is scarcely inferior to any other salmon. While the flesh has a very fine flavor, it is paler than that of other red salmon, and the species has consequently been neglected by canners; but it is probable that it will eventually be utilized for canning purposes, and its excellent qualities when fresh are undoubtedly destined to give it a great commercial value. Its chief consumption now is by Alaskian natives. The humpback salmon generally seeks the smaller streams for the purpose of spawning and deposits its eggs a short distance from the sea, sometimes within only a few rods of the ocean. At Kadiak Island, Alaska, where it is often very abundant, it arrives in the latter part of July, the run continuing only a few weeks. Spawning takes place in August.

The silver salmon is also known as silversides, skowitz, kisutch, hoopid salmon, and coho salmon. It is a beautiful fish, having a graceful form and a bright silvery skin. Its flesh, which is fairly good, usually has a bright red color, but as this fades on cooking it is not highly regarded for canning purposes, though large quantities are thus utilized. Its average weight in the Columbia and Puget Sound is eight pounds, but in Alaska it averages nearly 15 pounds. Its range is from San Francisco to northern Alaska, and as far south on the Asiatic Coast as Japan. It runs up the rivers to spawn in fall or early winter, when the waters are high, but usually does not ascend great distances from the ocean.

The dog salmon is the least valuable of the Pacific salmons, although it is dried in large quantities by the Alaskan natives. Its average weight is 12 pounds and the maximum is about 20 pounds. It is found from San Francisco to Kamchatka, being especially abundant in Alaska. The enlargement and distortion of the jaws give the species a very repulsive look, and the large teeth give to it its common name. When just from the ocean, the flesh has a beautiful red color and is not unpalatible, but it deteriorates rapidly in fresh water. It spawns in shallow rivers and creeks. Larger quantities are utilized in Puget Sound than elsewhere in the Pacific States, and it is also used considerably by the natives of Alaska.

The Steelhead.—Another anadromous salmonoid fish found on the Pacific Coast, popularly regarded as a salmon, is the steelhead (*Salmo gairdneri*), known also as hardhead, winter salmon, square-tailed trout, and salmon trout. It resembles in form, size and general appearance the salmon of the Atlantic Coast, and is distinguished from other Pacific Coast salmon by its square tail, its small head, round snout, comparatively slender form, light-colored flesh, and its habit of spawning in spring. It is more slender than the quinnat and consequently not so heavy for its length. Its average weight in the Columbia is about 10 pounds, although it sometimes reaches 30 pounds. Its range is very extended, reaching from the southern coast of California to the Alaska Peninsula, and is found in almost all the streams of the Pacific States which empty into the ocean. It begins to enter the Columbia in the fall, and is then in prime condition. Like the chinook, the steelhead ascends rivers for long distances, and it has been found almost as far up the tributaries of the Columbia as the ascent of fish is possible. As the greatest quantities of steelheads are caught in the spring, when they are spawning and are in a deteriorated condition, they are not generally esteemed as food; but when they come fresh from the sea and are in good condition, their flesh is excellent. As the demand for salmon has increased, steelheads have been utilized for canning, and they have formed a noteworthy part of the canned salmon from the Columbia River for a number of years past, as well as from the short coast rivers of Washington and Oregon. Their consumption fresh has been increasing yearly and considerable quantities have been sent to the Eastern States in refrigerator cars.

Artificial Propagation.— The first steps in an effort to restock with salmon the rivers of the eastern coast were undertaken by Massachusetts and New Hampshire about 1865. At

first eggs were obtained from Canada, but this source was cut off, and the authorities were compelled to attempt to get eggs by capturing salmon in the spring at the mouth of the Penobscot River, in Maine, and keeping them alive and well until they spawned in November. After some experimenting a few live salmon were safely caught and carried in floating cars to Craig Brook, near the mouth of the Penobscot, where ponds and hatcheries fed by a clear stream had been prepared for them. The fish throve; year by year quantities of eggs were obtained and despatched to other places to be hatched. In 1889, however, the Craig Brook station was acquired by the United States Fish Commission and enlarged into a regular establishment for the rearing of fry, on an extensive scale, to the age of six or seven months. Later other establishments were opened for the rearing and distribution of the landlocked salmon. Still more extensive operations in salmon culture have been undertaken on the Pacific Coast to replenish the rivers of California and the Columbia basin, from 40 to 50 millions of fry (principally quinnat) are annually being artificially hatched, reared and placed in the headwaters of the various rivers. For treatment of the eggs and fry, see FISH-CULTURE. See also FISHERIES.

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SALMON, a river in Idaho, which rises in Custer County, flows north and west into Snake River, 40 miles south of Lewiston. Its course is irregular; its total length is about 450 miles.

SALMON DANCE, among the American Indians, a dance of the Yurok, Karok and other tribes, held in the early spring on the Pacific Coast when the salmon begin to run up the rivers. No one is permitted to catch a salmon before the dance, nor for 10 days afterward.

SALMON-TROUT, a name applied to several distinct species of *Salmonidæ*: in the eastern United States to the great lake trout (*Cristivomer* or *Salvelinus namaycush*) which resembles the true chars or trouts except for the crested and toothed vomer bone and prominent teeth on the base of the tongue. The color varies greatly, but is usually dark gray with numerous well separated rounded spots of lighter gray. This species reaches a length of upward of three feet and has been known to attain a weight of 125 pounds. It is especially characteristic of the Great Lakes, but is found in fresh waters from Maine to Vancouver and northward to Alaska. Except when spawning in the autumn they live in the deeper waters of the Lakes and are extremely voracious. Next to the whitefish the lake-trout is the most important food-fish of the Great Lakes, and is caught chiefly by means of extensive gill nets operated by tugs. In order to maintain the fisheries many millions of eggs are now hatched artificially, both by the United States and by the Michigan Fish Commissions. In the West the steelhead salmon (*Salmo gairdneri*) and related species are sometimes known as salmon-trouts. The steelhead resembles the rainbow trout (q.v.), but is very much larger, has small scales and a larger mouth. It is abundant in nearly all of the rivers of the Pacific Coast, from California to Alaska, and is caught in considerable quantities for canning, and when captured in the fall immediately after leaving the sea, is esteemed as a fresh fish. The common Atlantic salmon (*Salmo salar*) also sometimes receives the name of salmon-trout, as in the Gulf of Saint Lawrence. The salmon-trout of Europe (*Salmo trutta*), also known as bull-trout and sea-trout, occurs in the Baltic Sea, about the British Isles and along the coast of France, and enters the rivers emptying into these seas. Its life history resembles that of the common salmon, with which it readily hybridizes. See SALMON; TROUT.

SALMONIDÆ, a family of highly-organized fresh-water and anadromous fishes of the northern parts of the world, which includes the salmon, salmon-trout, whitefish, grayling and their relatives. See SALMON.

SALOL, Phenyl Salicylate, $C_6H_4OHCOOC_6H_5$, is obtained by heating salicylic acid or sodium salicylate with phenol or sodium phenate, in the presence of condensing agents, such as phosgene, phosphorus trichloride, phosphorus pentachloride, or phosphorus oxychloride. It has also been prepared by heating salicylic acid at 160°–240° C. for a long time in the absence of air.

Salol is a white crystalline powder. It melts at 42°–43° C., readily dissolves in chloroform, ether, alcohol and many other organic solvents, but is almost insoluble in water. The compound was introduced into medicine by Nencki in 1886. When taken internally it passes unchanged through the gastric juice of the stomach, but upon reaching the small intestine it is slowly hydrolysed into phenol and salicylic acid by the alkaline pancreatic juice. Salol is therefore a good intestinal antiseptic, and has been extensively used in the diseases of the intestinal canal. It is a valuable substitute for salicylic acid in the treatment of rheumatism; and a mixture of salol and camphor has been recommended as a local anesthetic. Salol has also been employed for the coating of pills and capsules containing solids or liquids. The salol coating renders them insoluble in the stomach and permits their passage into the intestines.

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SALOME, sa-lō'mē, a Hebrew female name, common in Palestine in the days of Jesus Christ. The most notable bearer of it was the granddaughter of Herod the Great, born 10 A.D., who married her uncle, Philip the tetrarch, and is known in history as Salome, the dancer. She appears in the gospel as a young girl, who is instigated by her mother Herodias to ask of Herod Antipas the execu-

tion of Saint John Baptist. Josephus says she first married Philip the tetrarch, son of Herod the Great and Cleopatra, and afterward Aristobulus, son of Herod, King of Chalcis, her cousin-german, by whom she had several children. The name was also borne by Zebedee the mother of James the Elder and John the Evangelist, one of those women of Galilee who attended Jesus in his journeys and ministered to him. (Matt. xxvii, 56). She asked of Christ for her sons a special place of honor in his kingdom (Matt. xx, 21); and was a witness of the crucifixion (Mark xv, 20). Some infer, from comparing Matt. and John xix, 25, that she was a sister of Mary the mother of Jesus.

SALOMON, Haym, American patriot and financier: b. Lissa, Poland, 1740; d. Philadelphia, Pa., 6 Jan. 1785. But meagre details are preserved of his early career, but his record as an American patriot and his services in aid of the government in Revolutionary days are well known. He was called "the good Samaritan" by S. H. Gay in his life of James Madison, and is referred to by Madison as rejecting all recompense for the pecuniary help bestowed. He was a prisoner in New York in 1775, and in 1778 escaped to Philadelphia. There acquiring wealth as a banker, he freely loaned to Robert Morris over $350,000. He negotiated all the war subsidies from France and Holland and when Continental money was withdrawn, causing suffering among the poor of Philadelphia, he distributed $2,000 in specie to relieve distress. The large indebtedness of the government to Haym Salomon was never repaid to him nor to his heirs and has been the subject of some discussion. It was favorably reported to the United States Senate in 1850. Although the amount of public securities and Revolutionary papers filed in the register's office, Philadelphia, 15 Feb. 1785 reached $353,744, the inroads of the British army in 1814 destroyed every record in relation to the vouchers. On 24 Feb. 1893 a bill was presented to the House that a gold medal be struck off in recognition of Haym Salomon's services, his heirs to waive all claims for indemnity; but the measure, although reported favorably, was too late for consideration. Consult 'A Sketch of Haym Salomon, from an unpublished manuscript in the papers of Jared Sparks'; Adams, H. B., in 'Publications of American Jewish Historical Society, No. 2' (1894).

SALOMONS, Sir **David Lionel Goldsmith-Stern,** English electrical engineer: b. 28 June 1851. He was mayor of Tunbridge Wells in 1895, has been vice-president of the Institution of Electrical Engineers, and has published 'Electric Light Installations'; 'Photographic Formulæ'; and various monographs on electrical topics.

SALON, sä-lôn', **The Paris,** (1) the large gallery in the Louvre, in Paris, in which art exhibitions were formerly held; (2) a name given the annual art exhibition in Paris; (3) the leading galleries where modern artists exhibit their works; (4) an apartment for the reception of company, in the plural, fashionable assemblages, or circles of fashionable society. See Paris.

SALONICA, or **SALONIKI,** the ancient Thessalonica, a sea-port of Greece, in the Department of Macedonia, which was taken from the Turks at the close of the Balkan wars (q.v.) in 1913 and passed into the possession of Greece. Until then Salonica had been the capital of a Turkish vilayet of the same name. Situated on the Gulf of Salonica, in the Ægean Sea, 315 miles southwest of Constantinople, the town occupies a fortified slope, and, surrounded by stately cypresses and lofty white walls, ascends from the shore in triangular form. Its architecture is characteristically Oriental, the early Christian churches having been converted into mosques. Chief of these is Saint Sophia, similar to the celebrated mosque of that name in Constantinople, on a smaller scale, but beautiful; the church or mosque of Saint George (with walls 20 feet thick), which contains early Christian mosaics dating from 400 A.D.; Saint Demetrius, destroyed by fire in 1917, had a fine interior; and various others, besides Greek churches and Jewish synagogues. The numerous antiquities include the Citadel, or ancient Acropolis, with its seven towers, called by the Turks *Yedi-Kuleh,* containing a triumphal arch which dates from the time of Marcus Aurelius; the Propylæum of the Hippodrome, a splendid Corinthian colonnade of five pillars; the triumphal arch of Augustus, commemorating the battle of Philippi; the arch of Constantine, etc. There are large bazaars, and aqueducts bring water from the distant hills to the city. Saloniki, however, was also characterized by much squalor and miserable quarters, though considerable improvements have been introduced under Greek rule. Since the construction of various railway systems and harbor improvements, the trade, already considerable, has increased. The exports consist of corn, cotton, wool, tobacco, silk cocoons, opium, wine, brandy, skins, antimony and timber; the imports, of sugar, flour, coffee, coal, iron and hardware, petroleum, salt, rice, glass, etc. Great Britain had the largest volume of trade before the war; next in importance were Italy, France, Austria-Hungary and Turkey. Salonica (formerly Therma) is mentioned in historical annals, in connection with Xerxes' march through Greece. It was refounded by Cassander in 315 B.C. Saint Paul preached here and addressed two of his epistles to the converts of this place (Thessalonians). During the Roman-Macedonian wars it figured as the chief station of the Macedonian fleet. After the civil wars it became the first city in Greece. It was a seat of the Christian Church at a very early period. During the barbarian invasions, it was the most important stronghold and place of defense of the Eastern empire. In mediæval times its was taken (904) by the Saracens; (1185) by the Sicilian Normans; (1430) by the Turks. The population, about 165,000, is mainly composed of Greeks, Turks, Jews, Bulgars, Serbs, Italians and French.

During the first Balkan war Salonica surrendered to the Greeks with a Turkish army of 29,000 under Hassan Tahsin Pasha on 8 Nov. 1912. In the course of the European War Salonica was the scene of violent international complications owing to the failure of Greece to come to the assistance of Serbia against Bulgaria, as stipulated by treaty. On 18 Aug. 1917 a great fire broke out in the town and burnt for two days. Quite two-thirds of Salonica proper was destroyed and 100,000 persons rendered homeless. All the banks, business premises, hotels and most of the theatres were reduced to ashes. Only the bare walls of the old Byzantine Church of Saint Demetrius remained standing, while most of the other churches escaped destruction. See Greece; Venizelos, E.; War, European.

SALONICA, Gulf of (ancient Sinus Thermaicus), is the extreme northwestern arm of the Ægean Sea, between the peninsula of Chalcidice and the coast of Thessaly. Its length is about 85 miles; breadth, 50 miles, and consists of two distinct parts — one wide, extending from the southeast to northwest; the other narrow, from southwest to northeast.

SALPA, a genus of free-swimming ascidian of the order *Thaliacea,* and the family *Salpidæ.* They are met with as single or solitary organisms and as aggregate or compound collections, the so-called "salpa chains," but these are states of the same species. The solitary salpa produces by budding from a process termed the stolon, a long chain of aggregated embryos, which become the salpa chain. The individuals of this compound chain have the power of producing, by means of eggs, new solitary salpæ. This is one of the instances brought forward by Steenstrup in illustration of his views of the alternation of generations. The entire life-history, however, is not so much one of an alteration of generations as of a process of budding (asexual), alternating with reproduction by means of eggs (sexual). Thus, the first salp produces aggregate salps which are unlike itself, but the aggregated salps produce solitary salps unlike their parents, but resembling their grandparents. Each salpa is of oval or quadrate form, with an aperture at either extremity. Locomotion is effected by the expulsion of water from the posterior aperture, and the salpa-chains thus swim over the surface of the ocean. The principal organs of the body are compacted to form the so-called "nucleus." The salpæ are beautifully transparent and colorless and often phosphorescent. They abound in the waters of the Gulf Stream and in the Mediterranean.

SALSIFY, săl'sĭ-fĭ, a biennial composite (*Tragopogon parvifolius*), sometimes attaining four feet in height. The genus is popularly known as Goat's Beard, because of the long silky beard or poppus of the seeds. It grows wild in the south of Europe, but is cultivated as a vegetable. It has narrow grass-like leaves and solitary showy purple heads of ligulate florets, the involucre consisting of lanceolate leaflets much longer than the florets. The flowers close before noon. The fruits are plumed and float through the air like those of a dandelion. Salsify is hardy and has a very long tapering tap-root, white and fleshy, and with a flavor resembling oysters, whence it is sometimes called vegetable oyster or oyster plant. Black salsify (*Scorzoneia hispanica*) comes from Spain and is closely allied to the true salsify. It has a root like that of *Tragopogon,* except that it has a blackish skin. The leaves are undulate and the flowers yellow. The plant was once used for snake-bites.

SALSILLA, the common name of several species of the amaryllidaceous genus *Bomarea,* which produce edible tubers. Some are cultivated in greenhouses for their large gorgeously spotted flowers, borne in cymes on twining stems, and *B. edulis* is cultivated in the West Indies as a vegetable, its fleshy roots being also a diuretic and sudorific.

SALSOLA, a genus of the *Chenopodiaceæ,* with about 50 widely distributed species growing in saline soils, or on seashores, popularly known as saltwort. The small, axillary flowers are apetalous, but have a five-parted calyx, which in fruit encloses the utricle, and has a broad, horizontal, membranous wing. A maritime species (*S. kali*), the prickly saltwort, is a familiar spiny annual, its decumbent branches spreading from the central tap-root so as to form large rosettes on the sand. The closely-set rigid leaves radiate in all directions; they are small, awl-shaped and succulent, the mid-vein ending in a strong prickle. It is a widely diffused species and like some other plants of the same family, was formerly collected and burned for the impure carbonate of soda found in its tissues. Lumps of the fused ash were an important article of commerce, called barilla (q.v.), and yielded about 50 per cent of soda, being the original source of that chemical. Salsola was also a component of the "sope," mentioned by Jeremiah. To this genus also belongs the Russian thistle (q.v.).

SALT, sâlt, **Henry Stephens,** English biographer: b. Nynee Tal, India, 1851. He was educated at Cambridge and subsequently engaged in literary work and social reform. He has been honorary secretary of the Humanitarian League from its founding in 1891 and editor of *The Humanitarian* and *The Humane Review.* He has published 'Life of James Thomson'; 'Life of Thoreau'; 'Richard Jefferies: a Study'; Shelly: Poet and Pioneer'; 'Tennyson as a Thinker'; 'Animals' Rights'; 'The Logic of Vegetarianism', etc.; and edited 'Songs of Freedom'; 'Kith and Kin' (poems of animal life), and works by Godwin, Thoreau, Melville, etc.

SALT, Sir **Titus,** English manufacturer: b. Morley, Yorkshire, 20 Sept. 1803; d. 29 Dec. 1876. He was the first to introduce the manufacture of cloth from the wool of the alpaca into England. The model village of Saltaire (q.v.), three miles from Bradford, on the river Aire, was built in 1853 for the workmen engaged in his factories. He was a member of Parliament in 1859 and in 1869 was made a baronet. Consult Balgarnie, 'Life of Sir Thomas Salt' (1877); Holroyd, 'Saltaire and its Founder.'

SALT, the common name for sodium chloride, NaCl. It occurs native in large quantities and it may also be prepared by neutralizing hydrochloric acid with sodium carbonate or with sodium hydrate and evaporating the solution. It is soluble in water, its solubility at the boiling point being only a little greater than the solubility at the freezing point. It is insoluble in absolute alcohol and in aqueous alcohol it dissolves to a greater or lesser extent, according to the proportion of water present. Salt crystallizes in the isometric system, usually in cubical or pyramidal forms, though octahedra also occur. Its solution is neutral to test papers and a saturated solution, when cooled to some degrees below the freezing point of pure water, deposits a hydrate having the composition $NaCl + 2H_2O$. When cooled to 9° F. below zero, a saturated solution throws down the hy-

drate $NaCl + 10H_2O$. Pure salt is ordinarily white in color, but it is transparent and colorless, with an ice-like lustre when crystalline. It is slightliy hygroscopic and when heated it decrepitates markedly. It melts at about 1500° F., and it may be vaporized by raising it to a strong white heat in a current of nitrogen gas. Its specific gravity is 2.16 and its specific heat is about 0.214. Salt is far more transparent to radiant heat than glass is and physicists therefore employ prisms and lenses of clear rock salt in experiments upon the infra-red rays of the spectrum. (Consult on this point, Tyndall, 'Contributions to Molecular Physics in the Domain of Radiant Heat.') Salt, from its abundance, is greatly used in the arts as a source of chlorine and of sodium. See CHLORINE and SODIUM).

In chemistry, a general name for any compound which may be regarded as consisting of an acid with its hydrogen partially or wholly replaced by one or more metallic bases, or by basic radicals; or for a compound consisting of a basic substance whose hydrogen has been more or less completely replaced by acid radicals. Ordinary sodium chloride, NaCl, for example (which is the substance commonly known as «salt» about the household), may be regarded as hydrochloric acid, HCl, in which the hydrogen has been replaced by sodium. Acetamide, $(C_2H_3O)H_2N$, is a «salt» in accordance with the second portion of the definition, since it may be regarded as consisting of ammonia; NH_3, in which one atom of hydrogen has been replaced by the monovalent radical «acetyl,» C_2H_3O, of acetic acid. Simple chemical salts are classified, for convenience, as «acid,» «normal,» and «basic.» An «acid» salt is one whose acid radical still contains one or more atoms of replaceable hydrogen; while a «normal» salt is one which contains no replaceable hydrogen. When sulphuric acid (H_2SO_4), for example, reacts with salts of potash, the potassium may replace half of the hydrogen of the acid, or all of it. In the former case we have the compound $KHSO_4$, which is known as «acid sulphate of potassium»; and in the latter case we have the compound K_2SO_4 which no longer contains hydrogen, and which is therefore called the «normal» sulphate. The acid salt may be regarded as an intermediate stage between the original acid and the «normal» salt. A «basic» salt is one which contains one or more molecules of hydroxyl, or of a metallic oxid, which can be replaced by an acid radical with the formation of a normal salt. A basic salt may therefore be regarded as intermediate between the base and the normal salt. Comparatively weak bases such as lead and bismuth, form basic salts, but powerful bases like lime and soda do not. Lead, for example, forms a basic nitrate having the composition $Pb(OH)NO_3$; and when this is treated with nitric acid (HNO_3), the hydroxyl is replaced by an «NO_3» radical, as indicated by the equation.

$$Pb(OH)NO_3 + HNO_3 = Pb(NO_3)_2 + H_2O.$$

A salt which contains two different basic or acid radicals is called a «double salt.» Ordinary sodium-potassium tartrate, or «Rochelle salt,» $KNaH_4C_4O_6 + 4H_2O$, is an example, and so also is strontium aceto-nitrate, $SrNO_3(C_2H_3O_2)$. The phenomena which occur when two normal simple salts combine to produce a double salt are doubtless quite complicated in some instances. The double salt $MgSO_4.K_2SO_4$, which is formed by the combination of the normal sulphates of magnesium and potassium, appears, when in solution, to be a simple mixture of the two constituent normal sulphates; but, on the contrary, the double salt $PtCl_4.2NaCl$, which is formed by the union of platinic chloride (see PLATINUM) and sodium chloride, acts as though it were the normal sodium salt of an acid having the composition H_2PtCl_6.

Physiological Uses of Salt.— Salt as a universal commodity has been used in all ages and civilizations. In biblical times the Jews offered salt to Jehovah with the first fruits of the harvest and the fruits of the earth; Homer calls it divine and chronicles its use in the repasts of his heroes; Tacitus tells of furious wars between the Germanic tribes for the possession of salt springs near their territories. Mungo Park saw the inhabitants of the coast of Sierra Leone give all that they possessed, even their wives and children, to obtain a salt supply. Salt is, in fact, an object of so general consumption, so necessary to man, that it affords an assured medium of exchange. The need for salt is not confined to man. Many animals seek this substance with avidity. Nothing pleases the appetite of sheep more than salt. Cattle may suffer cruelly from a lack of salt, and that, on the other hand, they thrive when it is added to their ration. Reindeer and red and roe deer love to lick the surface of brackish puddles and saline efflorescences. In all climates, in all latitudes, wild ruminants and other hoofed animals resort to salt licks, a circumstance of which hunters take advantage, choosing their shooting covers either where salt naturally effloresces or where they themselves have scattered it.

Salt was first used as an aliment at the time of transition from the pastoral and nomadic stage to sedentary and agricultural life. The Indo-European languages have no common word to designate salt, nor have they any for the greater number of the objects that relate to agriculture. But, on the other hand, they have common roots for all words relating to pastoral occupations. This is an indication that the primitive peoples from which modern races sprang were separated before they abandoned a pastoral life. They did not learn the art of agriculture until later, and with it they learned the use of salt. There are populations, ethnic groups, and castes that have never adopted it. The Egyptian priests did not salt their food. Plutarch was astonished at this strange disdain. And in the same way there are animals of the farm that are very fond of it, the dog and cat that do not care for it at all.

There is a well-established relation between a vegetable diet and the need for salt, and reciprocally between an animal diet and the exclusion of this article from food. The two kinds of diet, however, are not distinguished from each other by the quantity of salt which they contribute to the organism. In fact, both kinds are very poor in salt. Although both contain equally small quantities of chloride of sodium, they are distinguished from each other by another mineral product which they possess in an unequal though considerable degree. This is potash. In marked contrast with common salt, this substance, always abundant, varies greatly in its relative quantity in different kinds of food. There are foods that contain a great deal of it, and these are precisely those that are taken from the vegetable kingdom. Plants are generally distinguished by their richness in potassic salts. They accumulate enormous quantities of them, drawing them from the poorest soils. Inversely there are other aliments derived from animals that are generally relatively poor in these compounds. In fine, the capital difference that distinguishes in the eyes of the chemist the two modes of diet, is the abundance of potash in the vegetarian ration and its deficiency in the meat ration. The information given by chemical analysis may be succinctly stated as follows: The vegetable kingdom furnishes the economy with much potash and very little soda — about 25 to 150 times more potash than soda. On the other hand, the animal kingdom reduces the supply of potash without reducing in the same degree the supply of soda. It introduces into the economy no more than two to five times as much potash as soda. All this is perfectly true and interesting in itself, but what hidden relation is there between the proportion of potash that distinguishes the two diets and the inequality in the need for salt which they produce. M. Bunge believes that he has discovered this relation. His hypothesis is that potash is responsible for the like or dislike of salt in cookery. This he justifies by a series of closely connected inductions. The need for salt is the consequence of the loss of salt from the organism, as thirst is the consequence of the loss of water due to hemorrhage, transpiration or other causes. The need for salt implies a previous loss of salt. Secondly, the loss of salt should be a phenomenon of a chemical nature resulting from reactions of disintegration. Thirdly, this chemical phenomenon having, as is proved by experiment, a relation to the different kinds of diet, should be caused by their chemical characteristics — that is to say, by the difference in their proportions of potash. Contrary to M. Bunge, it is claimed by other chemists that an exclusive vegetable diet causes a need, a particular appetite, which can be satisfied by substances having the taste of cooking salt and containing either chloride of sodium or chloride of potassium. In brief, from a chemical point of view, it is a need for chlorides; from a physiological point, a need for salty flavor; that is to say, for a particular kind of gustative sensation.

Condiments and seasonings are found to have a justification that is to some degree of a physiological character. They insure the proper action of the stomach. Salt does more. At the same time that it puts in motion the secretion of the stomach it furnishes it with materials, at least with some of them. Hydrochloric acid, which is characteristic of the gastric juice and ensures its digestive efficacy, is derived from salt, from the chloride of sodium of the blood. The same origin should be ascribed to the chlorine compounds found in the juices of the stomach, fixed chlorides and organic chlorine. In other terms the material for the chlorine compounds of the gastric juice comes primitively from the salt of our food. Ordinary salt, the chloride of sodium, is one of the constituent elements of animal organisms, existing everywhere in them. The blood has a saline taste more or less marked; all the secretions are salty; the tears themselves are more salty than bitter, whatever good people may say about them. Salt water, in fact, bathes all living particles and leaches continually from the organic structure, escaping from all its tissues, carrying with it the waste matters which should be rejected from the body. Common salt is more suitable than any other for this purpose. In a dose of nine grams per 1,000 it forms a solution innocuous to the anatomical elements, that can circulate around the most delicate of them without causing the least damage. This close association with salt has become habitual to them from immemorial usage: they have adapted themselves to it, and it would lead to some inconvenience if another mineral constituent should be too abruptly substituted for it. In certain animals that have been bled to exhaustion, life may be kept up for some time if the blood is replaced by a saline solution, named, because of its properties, the physiological solution. A turtle or a frog in whose veins this fluid circulates continues to live for a considerable time.

According to statistical data the daily consumption of salt in Europe is on the average 17 grams per capita. Of these about two grams are necessary to cover the loss by disassimilation. These two grams represent *nutritive* salts. The remaining 15 grams would then represent on the one hand 8 to 10 grams carried away by excretions and necessary for restoring the constitution of the circulating liquids and a surplus; but, considering the influence of salt upon the secretions, it would not be prudent to say that this surplus is a sacrifice made to the pleasures of appetite.

Besides taking an active part in certain of the vital phenomena, common salt fulfils better than any other substance the conditions of a medium that is indifferent and yet suitable for the physiological necessities of living matter. In animals as well as in plants, in the mobile corpuscles of the blood as well as in the fixed elements of the tissues, living protoplasm is always rich in potassic salts. The interior medium which bathes it abounds, however, in sodic salts, particularly the chloride of sodium, resembling in this respect sea water, which might, if properly diluted, circulate in the veins and replace for a time the plasma of the blood, as we have seen may be done with the physiological solution. Some naturalists, recalling the circumstances under which life appeared on the globe and the manner in which it was for a long time maintained in the saline waters of the Palæozoic seas, have thought they perceived in this fact the survival of an ancestral condition. From this point of view chloride of sodium would be an element handed down from remote times, belonging to a medium suitable to animal life, to the blood and to the organic humors; and salted food, by introducing it about the anatomical elements of the body, would recall the marine origin of animal life, would connect, as one may say, the physiology of the present with that of the past.

Origin of Salt Deposits.— Nearly all rocks contain sodium in small quantities, in combination with other rock elements. When sodium-bearing rocks decay, the sodium, on account of its ready solubility, is one of the first elements to be contributed to circulating waters. Com-

bining with chlorine, it forms common salt. Much common salt exists in sedimentary rocks, and is contributed directly to circulating waters. By rivers it is carried down to lakes or to the ocean.

When rivers flow into lakes that have outlets, whatever salt is carried to the lake is carried out again by the out-flowing stream. But in lakes with no outlet and in the ocean, where there is little loss of water except by evaporation, salt is constantly being added and none removed. Since practically all rivers carry extremely small amounts of salt, in the course of time the ocean and most undrained lakes come to be very saline. When sufficiently salty to be perceptible to the taste, such lakes are spoken of as salt lakes. These lakes usually contain other salts in addition to common salt.

The salinity of various well-known bodies of water is tabulated below:

	Per Cent Common Salt	Per Cent Total Salts
Mississippi River at Memphis	.002	.02
Atlantic Ocean	2.790	3.63
Great Salt Lake	12.000	14.99
Dead Sea	8.030	22.30

When the degree of concentration becomes so great in these bodies of water that they can hold no more, salt will be deposited; just as brine, by boiling, leaves a crust of salt on the bottom of a dish. It is only in basins where evaporation is excessive that waters become concentrated enough for salt to be deposited. Such conditions are usually found only in arid regions, in undrained lakes and in arms of oceans or seas where evaporation is greater than river or spring supply, so that salt water from the open ocean or sea flows in to replace the excessive loss.

Many places are known where the less soluble salts are now being so deposited. In certain bays of Great Salt Lake and in many smaller lakes of the Great Basin, salts are now being laid down. Before the Salton Sea in southern California was flooded by the Colorado River, as high as 29 inches of salt was deposited daily during the dry season, most of which was common salt. Karaboghaz Bay, an eastern arm of the Caspian Sea, evaporates so rapidly that salt water from the main lake is constantly flowing in to make up for the loss. The concentration is so great that no life exists in the water and the less soluble salts are being precipitated, though as yet it is not saline enough for common salt to be deposited.

At seasons of flood, when rivers carry much sediment, the salt layers on the bottoms of the lakes or bays may be buried beneath layers of mud or sand. More salt may then accumulate as before and again mud and sand be washed in, until the salt is buried to a depth of hundreds, or even thousands of feet. The sands and muds solidify into rocks and later uplift of the land and erosion by rivers may expose the salt, as layers in the rocks, or they may be found by deep drilling. Such salt layers are common and are worked extensively in New York, Michigan, Kansas and other States, and in many foreign countries. Often many beds lie one above another, separated by layers of rock. In New York and in Kansas beds of solid salt over 300 feet thick have been discovered, and one at Sperenberg, Germany, is known to be over 3,000 feet in thickness.

It may also happen, as in the peculiar "Domes" of Louisiana, that water which seeps through salt beds at great depth may find its way toward the surface along cracks in the rocks and fill these with salt which it deposits on its upward way. Sometimes the force of the growing salt crystals may arch up the overlaying rocks into "Domes."

From deep beds, salt is secured in two ways. In New York, shafts have been sunk into the salt beds and it is mined like coal. But this underground method is employed more commonly in Europe. At Wieliczka, in Austria, about 1608 A.D., was opened up what is even yet the largest salt mine in the world. It is 984 feet deep and extends 300 feet below sea-level. In the mine are over 25 miles of railroad, converging at a central station carved entirely out of solid salt. In an enormous ball room the walls and ceilings of which glitter with salt crystals many royal fetes have been held. Over 1,200 miners are employed in the mine. Such underground mines, however, are rare. In the majority of cases wells are drilled through the overlying rock, and water is forced down into the beds and dissolves the salt, which is then pumped up in the form of brine and is evaporated either by the heat of the sun or over fires.

It also happens, as at Onondaga Lake, New York, and in many other places, that underground waters seeping through the salt beds come out at the surface as natural brine springs, whose waters are evaporated as in the previous case.

At a few localities about Great Salt Lake and San Francisco Bay, the salt waters are allowed to flow into shallow artificial basins, in which they can be completely shut off from the main body of water. These are allowed to stand until the sun's heat has evaporated the water, leaving a layer of salt. This process is much more widely employed in Europe than in the United States. (See MINERAL PRODUCTION OF THE UNITED STATES). Consult Dake, C. L., *Journal of Geography* (Vol. XI, 1913, p. 285).

SALT DEPOSITS, Formation and Geology. See SILURIAN.

SALT-GLAZING. See GLAZING.

SALT INDUSTRY, The.— Salt occurs in nature in two forms: as rock salt in beds; and as natural brine. In the United States the larger part of the production is from the rock salt deposits. New York leads the other States in output of rock salt, producing more than twice as much annually as Kansas, its nearest competitor; with Louisiana in third place and Michigan fourth. In the manufacture of brine salt Michigan led in 1917 with an output of 891,195 tons; New York ranking second with 517,273 tons; Kansas third, with 299,877 tons; and California fourth, with 192,565 tons. Rock salt produced and marketed as such in the United States in 1917 amounted to 1,605,025 tons, valued at $3,897,595 — an average value of $2.43 per ton. The actual prices varied over the country from $1.66 per ton in Kansas to $10 per ton in Idaho. Of other grades of salt marketed in 1917 the totals were: 1,048,572 tons of common fine packers' salt; 688,022 tons of table and dairy salt; 493,515 tons of coarse packers' salt; 159,361 tons of solar salt; 93,094 tons of pressed block salt; and 2,890,588 tons in the form of brine. The prices throughout the country for grained salt varied from $2.41 per ton in New Mexico, and $2.52 per ton in New York, to $15 per ton in Hawaii, and $15.60 per ton in Idaho. The consumption of salt in the United States in 1917 was nearly 140 pounds per capita. The exports in 1917 amounted to 113,993 tons, valued at $1,000,773 — nearly all going to Canada and Cuba; and the remainder distributed widely all over the world. The history of the manufacture of salt in this country is somewhat obscure in its early dates, but covers the entire period subsequent to the settlement of the colonies by the English. The early processes of making salt, which was first produced in this country in Virginia prior to 1620, consisted of exposing sea-water to the rays of the sun or by boiling it in pans or kettles till the salt had settled to the bottom. Later these same processes were used in extracting salt from the natural salt springs, but at the present time sea-water is little used for this purpose. Instead wells are sunk into the salt deposit, fresh water pumped in or allowed to flow in from a natural channel, and when thoroughly saturated the brine is pumped out and the salt extracted by evaporation. There are several methods of evaporating the brine; kettles, open pans, vacuum pans or grainers in which the brine is heated either directly by a fire below or by steam-pipe coils. Where kettles or open pans are used, the brine is usually boiled by direct heat, whereas in the grainers and vacuum pans steam heat is used. In the grainer process the brine is evaporated from rectangular vats about 12 inches deep by means of coils of pipes suspended in them and carrying either live or exhaust steam; when the water has been evaporated, the salt is removed from the bottom of the pan by mechanical scrapers. Solar salt is made in vats or ponds, covered or uncovered, and rock salt is mined and is now produced in much greater quantities than solar salt. The solar process is in use in California, Utah, and in Syracuse, N. Y.; the open pan process in New York, Michigan and Kansas; the vacuum pan in Michigan and the grainers in New York, Michigan, Ohio and Kansas. (See SALT; SILURIAN SYSTEM). The statistics of the industry as given in the 1914 census are as follows:

	1904	1914
Number of establishments	146	98
Capital	$25,586,282	$33,151,134
Clerks, officials, etc	418	724
Salaries	$487,425	$968,409
Wage-earners	4,666	5,089
Wages	$2,066,399	$3,041,294
Cost of materials used	4,166,137	4,455,457
Value of product	9,437,662	10,271,358

The table following shows the quantity of salt produced by States for the year 1917.

The number of plants in operation increased from 98 in 1914 to 128 in 1916; in 1917, 125 plants were active. The output of 4,872,656 short tons in 1914 was increased to 6,978,177 tons in 1917, and the value of the 1917 output was $19,940,442; an increase of 9.7 per cent in quantity and 46.1 per cent in value over the figures for 1916.

STATES	Number of plants	Production, short tons	Value
Michigan	24	2,250,939	$6,877,202
New York	23	2,164,069	5,371,713
Ohio	9	1,026,803	2,839,575
Kansas	10	746,976	2,027,466
California	26	215,154	933,429
Texas	.....	85,181	564,029
Utah	.....	79,195	352,145
West Virginia	.....	24,844	191,044
Idaho	.....	16	216
All Others	.....	385,000	783,623

The group "all others" in the table above includes Hawaii, Louisiana, Nevada, New Mexico, Oklahoma, Pennsylvania, Porto Rico and Virginia. The individual figures are reserved to avoid revealing private business details to competitors.

For purposes of comparison the salt industry will be described according to States.

California.— The Spaniards, Mexicans and Indians first gathered salt in this State from the "tide lands" along the shores of Alameda Bay, the natural sinks or ponds there retaining the water which was evaporated by the sun, thus leaving the salt. No attempt was made to improve the quality of the salt till 1864, at which time the Crystal Salt Works were built. These works consisted of ponds for receiving and settling the sea-water so as to precipitate the gypsum and other impurities less soluble than the salt. After the salt itself was precipitated, the mother liquor, or bittern, was drained off leaving a salt of high quality, which was gathered up and conveyed to the warehouses. Thousands of tons of salt are taken to refining works in San Francisco, where it is subjected to artificial heat for the purpose of more thoroughly drying it, and ground into various forms used in chlorination works, packing-houses and silver mills, and for table and dairy uses. The principal salt works in California are located at Alvarado, Newark, Mount Eden, Russell and Baumberg on the eastern shore of San Francisco Bay, under the management of the Federal Salt Company, but there are other works located at Redwood City and San Mateo, in San Mateo County; at Salton, in Riverside County; National City, in San Diego County; near Danby, and at Ostend Station, near Los Angeles, in San Bernardino County; from the saline springs near Sites, in Colusa County; and at Black Lake, in San Luis Obispo County. The dense brine of Owens Lake yields a high percentage of salt and its waters are estimated to contain 160,000,000 tons beside much potassium chloride. The Searles Lake basin covers nearly 12 square miles — a crust from 60 to 100 feet thick, mostly salt. Rock salt outcrops for four or five miles on the north side of the Avawatz Mountains in San Bernardino County and is beginning to be worked. It is of excellent quality, 98 per cent pure. In 1917 the total production in California was 1,536,199 barrels valued at $933,429.

Idaho.— In recent years salt has been made chiefly in Bannock and Bear Lake Counties, in the vicinity of Stump Creek and Tygee Valley in southeastern Idaho. The product is derived from salt springs, but it is known that

these are underlaid by beds of rock salt. The industry is centred at Auburn, Wyo. The 1917 output was very small, hardly reaching 20 barrels, used for feeding cattle.

Illinois.— There is only one establishment in Illinois, located at Saint John, Perry County, which in 1917 produced but a small quantity of salt.

Kansas.— The first salt produced in Kansas came from the marshes scattered over the central part of the State, along the banks of which crude factories were engaged in the business till 1868, but these were in time superseded by others of a more modern character. In 1867 wells were sunk at Solomon City and a plant erected for the purpose of drying the brine which had been struck at about 75 feet. In 1874 William Dewar established a plant in the same city, using the solar system of drying. The manufacture of salt was not very extensive prior to 1880, when 2,000 barrels were made; by 1890 this amount had increased to 1,140,799 barrels, and in 1900 to 1,645,350 barrels. The greater portion of the salt made in 1900 was evaporated by the grainer and open pan methods, though a small amount was made by solar evaporation. Brines are found in many localities in the eastern part of the State and are worked locally to some extent. In the development of the coal and petroleum industries in 1887, rock salt was struck near Hutchinson. In the same year a body of salt was also struck at Lyons, in Rice County, by a party of prospectors in search of oil or natural gas. In 1890 a company was formed and a shaft sunk, the drill penetrating the body of salt at 800 feet and passing through the bed to a further depth of 265 feet, making the total depth of the mine 1,065 feet. On sinking this shaft through the bed of salt, 15 workable veins, ranging from 4 to 18 feet in thickness, and alternating with layers of shale from three-quarters of an inch to five feet in thickness, were penetrated. In mining this salt, mining or channeling machines operated by compressed air are first used to undercut the salt; holes are made by air drills, dynamite inserted and exploded by electricity, thus bringing the salt to the bottom of the mine. It is then removed from the mine to the mill above ground, crushed and separated into nine different grades by passing over screens. It is then stored in bins ready for shipment or to be loaded on railway cars. At Anthony the salt beds show a combined thickness of 404 feet in a total depth of 1,350 feet; at Lyons the thickness is 275 feet in a depth of 790 feet; and at Kanopolis 250 feet in a maximum depth of 900 feet. The beds at Lyons and Kanopolis furnish the brines now worked at Ellsworth, Hutchinson, Sterling and elsewhere. Rock salt is known to underlay all of Rice and Kingman counties, nearly all of Reno County, and parts of Saline, Ellsworth, Barton, McPherson and other counties in the south central part of the State. The quantity of salt produced in 1917 in Kansas was 5,333,408 barrels valued at $2,027,466.

Louisiana.— Until 1898 nearly all the salt produced in Louisiana came from Avery Island, where the first attempt to make salt in the State was made in 1791 by John Hays. The first shaft sunk on Avery Island was eight by eight feet and 83 feet deep. This was afterward leased to the American Salt Company, which continued it to a depth of 190 feet. In 1897 a new shaft, 500 feet deep, was sunk near the old one, and the new works were equipped with the most modern appliances. In 1898 a shaft was sunk on Belle Isle by the Gulf Company, of Morgan City, but water by dropping through the roof forced the abandonment of this, and a new one was sunk near it, an evaporating plant erected, and a considerable quantity of salt produced by the grainer process. The most important deposits in the State are on the Five Islands, or Salt Islands, as they are variously called, comprising Petite Anse, Grande Côte, Belle Isle, Côte Blanche, and Côte Carline. On the two first named rock salt is mined on an extensive scale. There are also large areas of rock salt in the north central and northern parts of the State. Owing to the very few operators, the figures of the yearly output are not reported in the interest of privacy of individual affairs.

Michigan.—An appropriation of $3,000 was made on 4 March 1838 by the State for experimentation by the State geologist, and other work was done in 1840, 1841 and 1842, but no well was sunk till 1859 when a private corporation established a plant at Saginaw. During the year 1860, 472 barrels were produced and was gradually augmented, but irregularities in manufacture soon compelled the establishment of a State salt inspection bureau, and the salt manufactured was regularly inspected by the State official. The productive districts are three: (1) the southeastern part of the State, along the Detroit and Saint Clair rivers; (2) the central (nearly) part of the Lower Peninsula, especially in the Saginaw Valley; (3) along the west coast of the Lower Peninsula. Rock salt is worked at Ludington and Manistee and there is an undeveloped area on Thunder Bay near Alpena where five beds make up a total depth of 300 feet, with intervening streaks of gypsum and anhydrite. The output of commercial salt in Michigan is larger than that of any other State in the Union, and is approached only by that of New York. In 1917 it amounted to 16,071,704 barrels, valued at $6,877,202.

Nevada.— The most important deposits are along Virgin River in the southeast part of the State. There are also numerous saline valleys throughout the Great Basin. In 1909 there were only three establishments in the State, the product being made from brine springs by solar evaporation. In that year the production was valued at $19,847. The production in 1915 was 6,926 barrels, valued at $3,950. Since that year the production has been concealed by grouping it with that of other States.

New York.— The manufacture in New York by white men was begun in 1788 in the Onondaga district. In 1797 the State assumed control of this reservation, maintaining it until 1898 when the title was sold because of the great expense of keeping up the works. During the first 44 years only boiled salt was made in the district, but in 1841 solar salt was also made. In 1883 the Warsaw district was opened up and about the same time the Genesee district began producing. In 1885 rock salt mining was begun near York, Livingston County; in 1892 shafts were sunk at Livonia and Greigsville in the same county. In 1888 the Solvay Process Company of Syracuse found salt in the south end of the valley of the Onondaga Creek in the town of Tully. Within three years 29 other wells were put down to the salt bed. They were all connected with the Tully Lakes, the water flowing by gravity into the salt shafts and forming a brine which is pumped out and carried to the works. The area in New York underlain with rock salt comprises a corner of Genesee County; the east half of Wyoming County; nearly all of Livingston County; and that part of Ontario County west of Canandaigua Lake. It has recently been developed also in Erie County, at Eden Valley, Springville, Perry and Gowanda, whence the bed reaches as far south as Pittsburgh, Pa. In 1917 the production amounted to 15,451,453 barrels valued at $5,371,713.

Ohio.— Saltmaking was first attempted in 1798 at the Old Scioto Salt Works on the Salt Creek, in Jackson County. These continued till 1808 when the management was taken over by the State under the direction of the State superintendent, but as they became unprofitable as a State institution, they were later sold. It was not till 1825 that the other properties in Ohio were developed. The bulk of the present day production comes from two districts: (1) in the northeast section of the State, comprising Cuyahoga, Medina, Summit, Wayne and Lake Counties; and (2) in Meigs County, in the same basin in which the chief West Virginia salt area lies, just across the Ohio River. In the latter locality there are 148 feet in aggregate thickness, in layers varying from 3 to 52 feet thick, alternating with limestone and white shale to a depth of 3,710 feet. The industry centres at Pomeroy, where enormous quantities of brine have been raised, draining strata from many miles to the north, owing to the dip toward Pomeroy. The principal grades of salt made are table, dairy and common fine, solar and rock salt. The total production in 1917 was 7,331,373 barrels valued at $2,839,575.

Oklahoma.— The first works were established in 1896, near Okeene, on a branch of the Cimarron River, and this was soon followed by three others. There are also works near Ferguson in the western part of the State and near Salton and Vincent in the southwestern part. The industry is for local consumption only.

Pennsylvania.— The salt industry was established in the Conemaugh River Valley early in the 19th century. About 1810 William Johnson commenced boring on this river near the mouth of the Loyalhanna, and was soon followed by many others. In 1812 salt was discovered near the present site of Saltsburg, in Indiana County, and by 1820 there were 32 pans and 190 kettles in operation in this county; Armstrong County had 38 pans in operation; Erie County 18 kettles of 32 gallons each; and Westmoreland County six establishments producing 70,000 bushels. In 1909 there was only one establishment in the entire State. The total output is comparatively small and consumed locally. It is now included in "Other States"

Texas.— The first well was sunk at Colorado City in western Texas in 1884, followed by another in 1889, and by a third in 1899. The principal production at present comes from Palestine (Anderson County) and Grand Saline (Van Zandt County) in the eastern part of the State. Considerable quantities are made also from the salt lagoons along the southwest coast. The total production in 1917 was 608,192 barrels valued at $564,029; the greater portion of the production being made in grainers or open pans.

Utah.— The first salt was harvested in 1848 from the shores of the Great Salt Lake. In 1900 the production amounted to 246,935 barrels, nearly all of which was made by the solar evaporation process. There is also a considerable production at Garfield, and natural brines are worked at Nephi. Rock salt is mined in the Sevier Valley, near Salina, Redmond and Gunnison. About 1860 the chlorination process for the reduction of silver from its ores was discovered, and salt for this purpose, produced at the Great Salt Lake, was first used at the Alice Mine in Butte, Montana. The total production in 1917 amounted to 565,452 barrels valued at $352,145.

Virginia.— The only factory in this State is located in Saltville, in the valley of the Shenandoah River. The production is relatively small and is used in the production of soda-ash, bicarbonate of soda, etc., by electrolytic process.

West Virginia.— The principal points at which salt has been manufactured in this State are: Charleston, on the Kanawha River; Hartford, Mason City, Clifton and other places in Mason County, along the Ohio River; and near Birch on the Elk River; but the seat of the industry at the present time is in Mason County, opposite the Pomeroy workings of Ohio, only one of the four establishments in operation being outside. The first salt furnace in Kanawha County was erected in 1797, by a Mr. Brooks. On 1 Nov. 1807, David and Joseph Ruffner began boring for salt on the land which is now the present site of Charleston, on 15 Jan. 1808 struck a large stream of brine, and on 8 February secured their first output. By 1817 there were 30 furnaces and 15 or 20 wells in operation, which number had increased in 1835 to 40 furnaces. In 1849 Williams and Stevens erected the first salt furnace on the Ohio River at West Columbia; in 1854 another was erected by Hartford, Conn., parties; a third was erected at Mason City; and within a few years 10 more were erected, but the development of the industry in other States so overwhelmed the trade in this State that in 1909 there were only four in operation. Since then the industry has improved, reaching 238,397 barrels in 1916. The total output in 1917 was 177,386 barrels, valued at $191,044. Consult United States Bureau of Mines Bulletin 146, 'Technology of Salt Making' (Washington 1917); United States Geological Survey Bulletin 669, 'The Salt Resources of the United States' (Washington 1919); Martin, G., 'The Salt and Alkali Industry' (New York 1916).

SALT LAKE CITY, Utah, capital of the State, county-seat of Salt Lake County, and the central seat of the "Mormon" Church, is finely located on a gentle slope at the western base of the great Wasatch range of mountains. The magnificent mountains behind the city, the lovely valley in front, the stately Oquirrh Range beyond the valley and Great Salt Lake, 20 miles to the northwest, add immensely to the attractions of the city. The elevation of the site above sea-level is 4,800 feet. The

main portion of the city is laid out in blocks of 10 acres each; the streets run at right angles and are 132 feet wide. Being in the arid belt, all vegetation depends upon irrigation, but nevertheless it is a city of gardens, shade-trees and flowers. The city is a central station for the Rio Grande Western Railroad, the southern terminus of the Oregon Short Line Railroad of the Union Pacific system, the eastern terminus for the Los Angeles and Salt Lake Railroad and the Western Pacific from San Francisco.

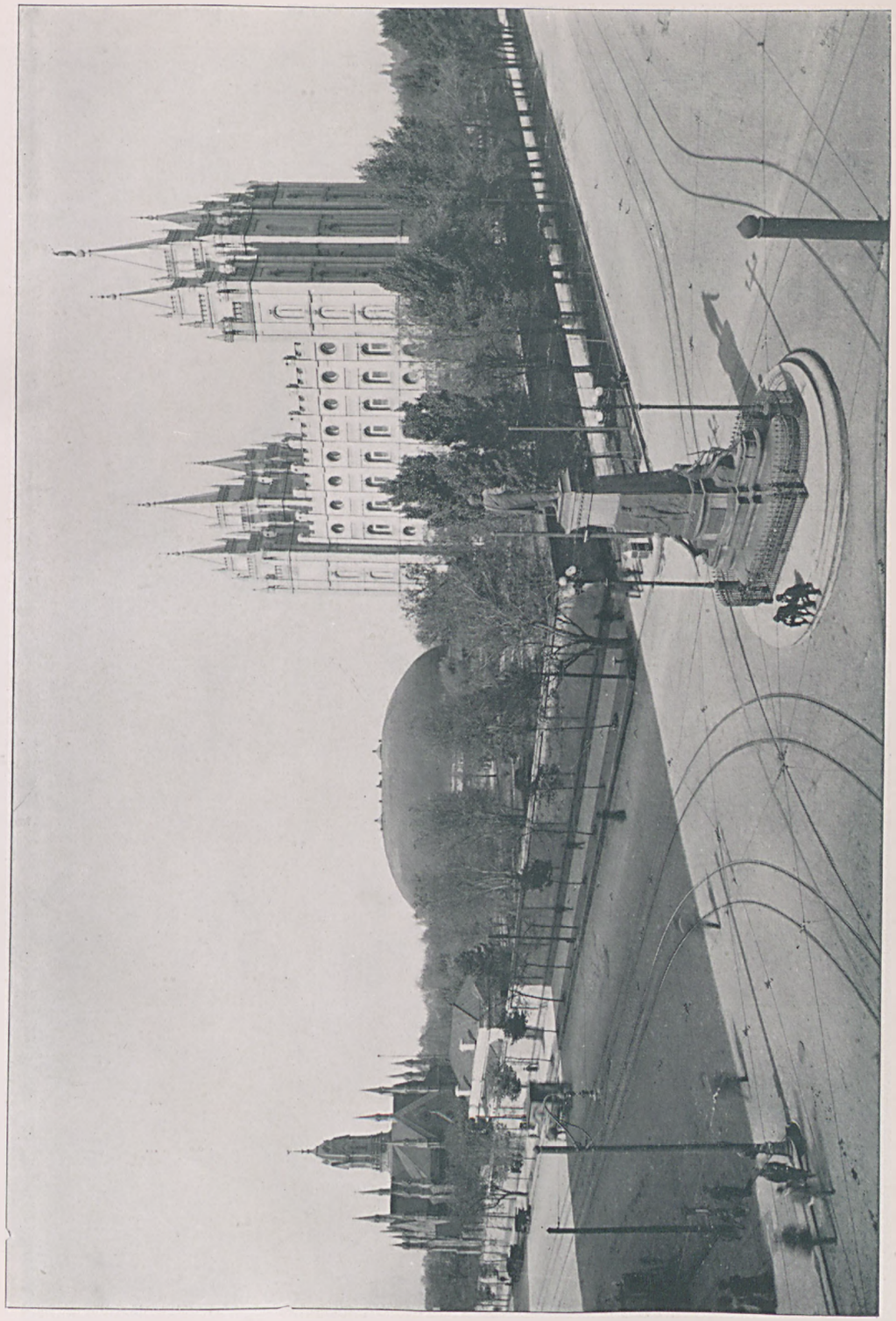
The trade of the city is very great, extending over Utah, western Wyoming, southern Idaho and eastern Nevada. The great mining districts of Park City, Big Cottonwood, Tintic, Bingham, are none of them more than three or four hours' ride from the city; the great smelters are in the valley only eight miles away, and Salt Lake is the general depot and clearing-house for their business. The miners from all over Utah and far into Nevada and Idaho send their ores to Salt Lake smelters for reduction, and purchase their supplies in the city. The bullion purchased in the city aggregates $25,000,000 annually. There are 20 banks in the clearing-house, five savings banks and several loan associations. The total clearings for all the banks in 1915 amounted to $350,000,000. The Salt Lake Mining and Stock Exchange, one year, sold 10,169,741 shares that aggregated $6,165,323.15. The Lehi Sugar Factory, the chief ownership and business of which is in Salt Lake, one year made from 70,000 tons of beets, 23,000,000 pounds of sugar. The Salt Works on the lake shore, and owned in the city, manufacture annually 60,000,000 pounds of salt, valued at $300,000. The Zion Co-operative Mercantile Institution sells goods to the amount of about $6,000,000 annually. The product of its shoe factory amounts to over $1,000,000. The manufacturing establishments include car shops, boot and shoe factories, machine shops, foundries, cement and lime works, harness works, lumber yards, cigar and tobacco factories, and confectionery plants. The total products exceed $30,000,000 annually and employment is furnished about 10,000 persons.

The city has many fine structures. The joint city and county building is a most attractive building and cost, with furnishments, $800,000. The Mormon Church has recently constructed their Administration Building costing about $1,000,000. It is 165 feet in length by 102 feet in width, and four stories in height. For architectural effect it is one of the most beautiful office buildings in the United States. It is built of white Utah granite and the interior is finished in marble and onyx. The city has many imposing business blocks; some of the homes are palatial; the public schoolhouses are among the noblest in the country. Both the Episcopal and Catholic denominations have great hospitals, and the Latter Day Saints have a commodious hospital. There are private hospitals, as well as beautiful homes, for the poor and needy. The Saint Ann's orphanage, just south of the city, is a home and school for orphans and indigent children. The first known surgical operation for the removal of gall stones was performed in Holy Cross Hospital, Salt Lake City. The Latter Day Saints' College occupies several imposing structures, one of which is a Memorial Hall built in honor of Brigham Young. The Utah State University has a commanding site on the bench east of the city. The Military Post of Fort Douglas is three miles east of the centre of the city at an altitude 600 feet above Main street. There are two theatres in Salt Lake, one built by the people several years ago, prior to the coming of the railroad. A Home Dramatic Company was formed; instructors were sent for; there was plenty of native talent; the theatre was a success; the Home Dramatic Company still flourishes. One result has been that Salt Lake has more first-class musical talent than any other city of its size in America. The tabernacle choir of 500 voices has a national reputation. The organist in the tabernacle, the leader of the orchestra in the theatre, are both native Utahans. At the great jubilee celebration in 1897 there were 18 native martial bands in the procession.

Since 1847 Salt Lake City has been the headquarters of the Church of Jesus Christ of Latter Day Saints (see MORMONS), the home of the president and many of the high officers of the Church; the place where the semi-annual general conferences of the Church meet in April and October. The temple, the tabernacle and assembly hall (for winter services and for meetings of the priesthood and consultation), with the temple annex, occupy a square. The tabernacle is a unique structure, 150 feet by 250 feet in size, roofed like a beehive, the roof arches being without support over the structure, with comfortable seating capacity for 8,000 people, though not infrequently 10,000 people gather there. It has one of the finest pipe organs in America. It is the chief place of worship for the Mormon people. though each of the wards of the city has a meeting-house where services and Sunday schools are held every Sabbath morning, and evening meetings during the week. The temple is one of the most splendid structures in America. Its walls are of gray Wasatch granite, in solid blocks nine feet thick at the bottom, six feet thick at the top, with a foundation 16 feet thick and 16 feet deep. The building is 186½ feet long by 99 feet wide, and is 107½ feet high from foundation to cap stone, while towers and pinnacles extend 50 feet higher. The ground was consecrated and work begun in 1853; it was finished and dedicated in 1893. It is used for marriages, baptisms and all the rites and ceremonials of the Mormon Church. Since its dedication only the faithful are permitted to enter it. It cost, with furnishments, about $4,000,000.

About half of the people are Latter Day Saints. They have over 40 places for public worship. In 1876 the Roman Catholics established a mission in Salt Lake, a little later built a church and hospital. They now have charge of the great Holy Cross Hospital, the Saint Ann Orphanage, Saint Mary's Academy. Their cathedral is one of the finest and largest in the West — fully completed. A Protestant Episcopal Church was founded in Salt Lake in 1867, and two years later a hospital. It now conducts the hospital, has a church and a cathedral and carries on Rowland Hall, a modern high-class seminary for girls and young women. The Methodists came in 1869. They have five churches in the city, and a number of lesser

SALT LAKE CITY, UTAH



Temple Square, Salt Lake City, Utah, on the Denver and Rio Grande Railroad. Mormon Temple, at the right, Tabernacle in centre, Assembly Hall at the left, Pioneer (Brigham Young) Monument in foreground

SALT LAKE CITY, UTAH



The Mormon Temple

SALT LAKE CITY, UTAH



Shiplers, Photo.

View of Main Street

structures. A Presbyterian Church and school were founded in 1875. Westminster College has been added to its schools, and a new and very fine church is now completed. The Congregationalists have a great school and beautiful church. The Unitarians, the Central Christian Church, the Baptists and Christian Scientists have places of worship. The Jews have a fine synagogue.

The public schools of Salt Lake are interesting features of the city. The law requires the attendance of all minors (six to 18 years) for a fixed number of months annually. Books to pupils are free. The schools are governed by a board of education of 10 members. The board and superintendent are elected by the people biennially. There are 49 school buildings. In 1919, 23,341 pupils were enrolled, 21,687 attended the primary and grammar schools, 2,654 the high schools. The curriculum covers all branches taught in the best schools of the country, including music, dancing, sewing and manual training. In the high schools military training is insisted upon during the first and second years; and students are fitted for any of the universities of the country. In the graded schools 721 teachers are employed; in the high schools 160. Teachers' wages are from $50 per month to $125. The rule is to increase the salaries of the younger teachers from $20 to $40 per annum until the maximum wage is reached. In the schools one or more teachers came from practically every State in the Union. One public school building was completed at a cost of $633,000. The annual expense for schools is over $1,271,000. The value of the school property is $4,000,000, or about 4 per cent of the total valuation of property in the city. Cost of maintaining schools, per annum, $860,-965; cost of books, $60,000; cost, based on enrolment, $105 per capita; cost per capita for books, 44 cents. There is a good public library with four branches.

Salt Lake City has the commission form of government since 1911. There are five commissioners, and the chief of police, fire chief, board of public works, water superintendent, board of health, city physician and building inspector are all appointed by the mayor and confirmed by the commission. The city has warm springs within its limits, and the hot springs, four miles out, have wonderful medicinal virtues. In the bathing season trains run every few hours to Great Salt Lake, 25 minutes' ride. The city owns its own water system. A private monopoly owns the light, the electric power plant and street car franchises of the city. The car company operates 135 miles of electric road.

The first settlement on the site was made by the immigrants who came in the first immigration under the leadership of Brigham Young, and reached the valley on 24 July 1847. The history of Salt Lake has no counterpart. The first band of immigrants were desperately poor. The soil they located on would produce nothing except through irrigation; they were 1,000 miles from any settlement east or west; they came as refugees; they were met by desolation; still at their coming they knelt upon parched soil and held a praise service. Their first crop was almost a failure, their second nearly all destroyed by locusts; that they lived through their trials must have been because they had grown superior to distress. But they did live and multiplied. They had disciplined themselves to be content with life's barest necessities; they had few comforts, luxuries they did not dream of. They had been tossed naked upon the frontier; "a flaming sword that turned every way" was behind them. Since then there has been much clashing; once the government sent an army against them, but the city has grown and has become a great trade centre; it is the spot from which the Church of Jesus Christ of Latter Day Saints in every land receives direction; it is a beautiful city in itself; its surroundings are altogether august. No better climate can be found than in Salt Lake. In winter the thermometer seldom descends lower than 12 degrees above zero; it seldom reaches 100 degrees in summer; it has more clear days than any other city, and with the lake, the mountains, the springs and the invigorating air, it is a natural sanitarium. Pop. (1880) 20,768; (1890) 44,843; (1900) 53,531; (1910) 92,777; (1920) 118,110.

Consult Bancroft, H. H., 'History of Utah' (San Francisco 1889), and Powell, L. P., 'Historic Towns of the Western States' (New York 1901).

J. David Larson,
Secretary Commercial Club of Salt Lake City.

SALT LICK, a place where salt is found on the surface of the earth, to which wild animals resort to lick it up; sometimes near salt springs.

SALT MARSHES. See Shore Lines.

SALT RANGE, or **KALABAGH,** India, a mountain system in the Punjab, beginning on the south side of the Jhelum, and extending west to the Indus, reaching an elevation of from 3,200 to 5,000 feet. It consists of two chains running from east to west, which join in a high plateau; the general relief is bleak and dreary, while wildly picturesque. The mountains derive their name from the precipitous hills of solid rock-salt which occur on the border of the plateau. The salt stands out in huge cliffs at Mári, and the town of Kálabágh is built in an almost perpendicular hill of solid salt, in successive tiers,—the roof of each tier forming the street for the tier above. About 60,000 tons of salt are quarried annually, four-fifths from the Mayo mines, near Pind Dadan Khan. Coal and other minerals also are found.

SALT RIVER, (1) in Kentucky, has its rise in Boyle County, in the central part of the State; from whence it flows north, then west, then north by west to the northern boundary of the State, where it enters the Ohio at Westpoint, about 20 miles southwest of Louisville. It is about 100 miles long; and the chief tributaries are Rolling Fork, East Fork and Beech rivers. (2) A river in Missouri, which has its source in Schuyler County, in the northeastern part of the State, flows south by southeast to Monroe County, turns east, then northeast and southeast, and enters the Mississippi near the town of Louisiana, in Pike County. It is about 200 miles long, and is formed of three branches, North, Middle and South Forks.

SALTA, säl'tä, or **SAN MIGUEL DE SALTA,** Argentina, (1) capital of a province of the same name, in the elevated and well-watered valley of Lerma (1,202 metres), about

800 miles northwest of Buenos Aires. It is a bishop's see, and has a cathedral. Other important features are: the main square or Plaza on which stand the Cabildo, or capitol; the *Colegio Nacional*; a branch of the National Bank; an orphan asylum, hospital and the above-mentioned cathedral. There is a brisk trade, especially transit trade with Bolivia. It is connected by rail with Buenos Aires and Jujuy. The town is neat but unhealthful. Pop. 38,000. (2) The province of Salta is situated in the northern part of Argentina, and covers an area of 48,302 square miles. Its frontier borders on Bolivian territory. At the west it is mountainous. The highest summits reach an elevation of 6,000 metres, the plateaus 1,300 to 4,000 metres, and some of the passes 3,600 metres. The Sierra Lumbre and the Sierra de Sanita Maria border on the Andes. The mountains contain rich mineral deposits of gold, silver, copper, nickel, iron and lead. The waterways are numerous: The Vermejo and its tributaries, Rio San Francisco and Rio Balle, and Rio Passage (del Juramento), which joins the Paraná as Rio Salado. The climate depends upon the altitude, and different crops are planted accordingly. The products are sugar, corn, wine and European fruits; barley, potatoes and fodder-crops. The lower slopes and valley contain the pampas; the high summits and plateaus are treeless. The inhabitants are for the most part a mixed race of Spaniards and Calchaqui Indians. Pop. 161,150.

SALTER, William Mackintire, American author: b. Burlington, Iowa, 30 Jan. 1843. He was graduated from Knox College (Ill.) in 1871; studied for the ministry at Yale and at Harvard and was graduated as B.D. at the latter in 1876; subsequently he studied philosophy, as Parker-Fellow of Harvard University, at Göttingen, and political science at Columbia University. From 1883 to 1908 he was lecturer for the Societies for Ethical Culture in Chicago and in Philadelphia; from 1909 to 1913, a special lecturer for the department of philosophy in the University of Chicago. He is the author of 'On a Foundation for Religion' (1879); 'Die Religion der Moral' (Leipzig 1885); 'Moralische Reden' (Leipzig 1889); 'Ethical Religion' (1889); 'First Steps in Philosophy' (1892); 'Anarchy or Government? An Inquiry in Fundamental Politics' (1895); 'Walt Whitman' (1900); 'Nietzsche: the Thinker' (1914), and of various articles in philosophical and literary periodicals.

SALTILLO, sāl-tēl'yō, Mexico, capital of the State of Coahuila; situated on the Tigre River, 65 miles southwest of Monterey, near the border line between that State and its neighbor on the north, the state of Nuevo Leon, elevation 5,249 feet above sea-level. It was given the rank of city in 1827 and named Leon-a Vicario, or Saltillo, by which latter name it is universally known. It was noted for many years for the superiority of the serapes made by the Indians of the vicinity,—a distinction, however, which has hardly been maintained in recent years. The battle field of Buena Vista, the scene of the defeat of the forces of Santa Ana, by General Taylor, in 1847, is but five miles distant, and near this are the baths of San Lorenzo. In the immediate vicinity are successfully grown all the fruits of the temperate zone and many which pertain to the tropics. The principal buildings are the Civil hospital, the penitentiary and the Acuñ-a Theatre, and the chief manufacturing establishments are cotton mills, flouring mills and soap and cotton seed oil manufactories. The city enjoys a favorable reputation as a health resort. The three principal educational institutions,—the Juan Antonio de la Fuente School, the College of San Juan Nepomenceno and the Normal School maintain creditable museums and there are four public libraries,—the State library and those connected with the three schools above named, which altogether contain over 6,000 volumes. The Bank of Coahuila, with a capital of $1,600,000, and agencies of the National Bank, the Bank of London and Mexico and the Bank of Nuevo Leon provide the financial resources of the community. Pop. 35,414.

SALTO, Uruguay, the capital of the department of the same name on the northwest frontier opposite Concordia, Argentina, and at the head of navigation for large vessels on the Uruguay River. It is the shipping port of the surrounding region, a rich stock-raising district, and is 250 miles northwest of Montevideo, the capital of the republic, with which it is connected by rail. Pop. of town 19,788, of department 66,493.

SALTON SEA, a lake in the wide Colorado Desert or Imperial Valley in Imperial and Riverside counties in southeastern California. Under ordinary conditions it is a salt marsh covered in places by shallow lakes, about 30 miles long, 12 miles wide and 280 feet below sea-level. At times of freshets the lakes expand into a water body covering from 40,000 to 50,000 acres. In 1905 and 1906 the basin was flooded by accidental influx of water from irrigation ditches from Colorado River and it became a sea 42 miles long, 10 to 16 miles wide and 93 feet deep covering an area of about 470 square miles. The surface of the water at this stage was 198 feet below sea-level. In 1907 the influx of river water was finally stopped by dikes and since then the water area has been diminishing because of the great excess of evaporation over the very scant rainfall. The decrease in depth has averaged about 5.8 feet a year and at this rate the sea will return to its original condition in 1926 or 1927 when evaporation will equal the inflow of torrential waters from the slopes of the enclosed basin. Terraces slightly above sea-level on the sides of the basin indicate that there was formerly present a lake, called Lake Cahuilla by Blake, which was more than 120 miles long and 30 miles wide. Consult Mendenhall, W. C., 'Ground Waters of the Indio Region, California, with a sketch of Colorado Desert' (U. S. Geological Survey, Water Supply Paper 225, 1911); Newell, F. H., 'Salton Sea' (Smithsonian Institution, Annual Report for 1907); MacDougal, D. T., 'The Salton Sea' (Carnegie Institution, Pub. 193, 1914).

SALTONSTALL, sāl'ton-stâl, **Gurdon,** American colonial governor: b. Haverhill, Mass., 27 March 1666; d. New London, Conn., 20 Sept. 1724. He was graduated at Harvard in 1684, and became minister of the Congregational church of New London, Conn., in 1691. He succeeded Governor Winthrop as chief executive of Connecticut in 1708, and continued

in office until his death. The Saybrook Convention was suggested by him, and the historic «Platform» largely shaped by him. Through his efforts the first printing press was established in the colony. He was also active in the founding of Yale and in its establishment at New Haven.

SALTPETRE. See NITRATE OF SODA.

SALTPETRE, Chile. See NITRATE OF SODA.

SALTS, a very important class of substances in chemistry. The word salt was first used to designate the solid residue obtained by evaporation of sea water, and as sodium chloride is its chief constituent the term *salt* came to mean popularly that substance alone.

Many other substances besides common salt are known by the general name *salts* because of their similarity to common salt in general physical properties, such as solubility in water, taste, having crystalline form, etc. Some of the most common are saltpetre (potassium nitrate), smelling salts (ammonium chloride), etc.

The chemical meaning of the term salt is quite another thing. While the substances mentioned above are indeed salts in the chemical sense, many other substances, as oil of wintergreen, for example, that have none of the physical characteristics of common salt must also be included under this term. To the chemist, a salt is a chemical compound that may be considered as derived from an acid by the replacement of part or the whole of the hydrogen of the acid by a metal or a «radical» playing the part of a metal. For example, the salt sodium nitrate, $NaNO_3$, is derived from the nitric acid HNO_3, by the replacement of the hydrogen by the metallic element sodium, Na; also ammonium chloride NH_4Cl is derived from the hydrochloric acid HCl by similar replacement of hydrogen by the radical NH_4. The most general chemical conception of the composition of salts is that which formulates them as MxNy, where M is the basic or positive portion and N the acid or negative part of the salt. Both M and N may be either elementary atoms or groups of different atoms acting as single atoms (radicals).

Taking common salt (NaCl) as an example, the positive radical Na may be replaced by another metal, or by a complex group of elements which is positive as compared with the other component of the resulting salt. Likewise, the negative radical Cl may be replaced by some other non-metal, or by a group of elements which is negative as compared with the other component. When solutions of two salts are mixed it is quite common that the positive radicals make a more or less complete exchange of their negative partners. This exchange is called in chemical parlance, «reaction.»

Salts are formed in many ways; one of the most important being by the action of an acid on a base by which water and a salt are formed, the salt differing in properties from both the acid and base used. Thus hydrochloric acid and potassium hydroxide mutually react, the products being potassium chloride and water. $HCl + KOH = KCl + H_2O$. Salts are frequently formed by the action of an acid on a metal. Zinc and sulphuric acid forming the salt zinc sulphate and hydrogen $Zn + H_2SO_4 = ZnSO_4 + H_2$. A very common method for the formation of salts is by the process called double decomposition, whereby two new salts are formed when solutions of two salts are brought together. When a solution of barium chloride is added to a solution of sodium sulphate a white solid separates which is a new salt barium sulphate, while in the solution is another new salt, sodium chloride. $BaCl_2 + Na_2SO_4 = BaSO_4 + {}_2NaCl$.

Salts are often classified as normal, acid, basic and double. An acid having more than one hydrogen atom replaceable by basic atoms or groups may form both acid and normal salts according to whether a part or whole of that hydrogen is replaced. An acid salt is therefore to be regarded as potentially an acid. Sulphuric acid H_2SO_4 can form acid salt $KHSO_4$ and the normal salt K_2SO_4. An acid having three replaceable hydrogen atoms can form three varieties of salts. Phosphoric acid H_3PO_4, for example, can give two acid salts KH_2PO_4, K_2HPO_4 and a normal salt K_3PO_4. A basic salt is one derived from a base having more than one hydroxyl (OH) group and in which all of the hydroxyl groups have not been replaced by acid groups. Basic bismuth nitrate $Bi(OH)_2NO_3$ is derived from bismuth hydroxide $Bi(OH)_3$ by replacement of only one (OH) by the acid group NO_3. An acid salt still contains acid hydrogen and will unite with more base to form a normal salt. A basic salt still contains basic hydroxyl (OH) and will unite with more acid to form a normal salt. A normal salt contains neither acid hydrogen nor basic hydroxyl. The term double salt has been applied to two different classes of compounds, the dividing line between which is, however, often very faint. Acids having more than one replaceable hydrogen atom may form normal salts in which two or more different basic atoms or groups are combined with the acid group, as magnesium ammonium phosphate, $Mg(NH_4)PO_4$ or potassium sodium tartrate $KNa(C_4H_4O_6)$. Another class of double salts is formed by the union of two or more molecules of certain normal salts $K_2SO_4:AL_2(SO_4)_3$, $PbI_2:2KI$, etc. Double salts occur most commonly through the combination of one normal salt with another normal salt. One of these components will be a salt of a strong base which forms acid salts but not basic salts: the other component will be a salt of a weaker base which forms basic salts but not acid salts. That component which is the salt of the strong base, being the more acidic, appears as the negative radical; and the component which is the salt of the weaker base, being more basic, appears as the positive radical. Thus in the formula MxNy, in the case of double salts both M and N are in fact salts, and the double salt a union of a positive radical with a radical simewhat less positive.

Method of Naming Salts.—Part of the name is derived from the basic element or group present; thus those containing sodium are called sodium nitrate, nitrate of sodium, or often nitrate of soda, chloride of soda, etc. The other portion is derived from the acid element or group present. Thus salts derived from nitric acid are called nitrates; from hydrochloric acid, chlorides; from sulphurous acid, sulphites; from perchloric acid, perchlorates. It will be noticed that all but the last syllable is the same as the name of the acid and also

that this last syllable differs according to the last syllable of the name of the acid. An acid whose name ends in *ic* forms a salt whose name ends in *ate* (see exceptions below). One ending in *ous* forms an *ite* salt. A salt in which the acid part is a single element has the termination *ide,* even though the acid name ends in *ic*. Thus sulphur*ic* acid forms sodium sulph*ate*; sulphur*ous* acid, sodium sulph*ite*; hypophosphor*ous* acid, sodium hypophosph*ite*; hydrochlor*ic* acid, sodium chlor*ide*. Sometimes a metal forms two salts with the same acid in which the number of acid groups united with one atom of the metal varies. Thus iron (ferrum) unites with nitric acid forming two salts, $Fe(NO_3)_2$ and $Fe(NO_3)_3$. The first one containing the smaller number of acid groups is called ferr*ous* nitrate while the other is ferr*ic* nitrate.

The naming of acid salts has called into use a few other terms. The acid sodium salt of sulphuric acid $HNaSO_4$ is called acid sodium sulphate or hydrogen-sodium-sulphate. With an acid like phosphoric H_3PO_4 having three acid hydrogens we have H_2NaPO_4 di-hydrogen-sodium-phosphate or primary sodium phosphate, HNa_2PO_4 hydrogen-di-sodium-phosphate or secondary sodium phosphate. The normal salt Na_3PO_4 is also called tertiary sodium phosphate.

As has been said, the term salt, salts, sal, are often applied to various substances of household or medicinal use. A few of the most common are given below with list of their correct chemical names. Sal soda, sodium carbonate; Epsom salts, magnesium sulphate; Rochelle salts, sodium potassium tartrate; saltpetre, potassium nitrate; sal ammoniac, ammonium chloride; salts of tartar, potassium carbonate; Glauber salts, sodium sulphate. See REACTION; SOLUTION.

SALTUS, Edgar Everston, American novelist: b. New York, 8 June 1858; d. 30 July 1921. Educated, Sorbonne, Paris, Heidelberg and Munich, and was graduated from Columbia Law School in 1880. His first book was 'Balzac: a Study' (1884), which he followed by 'The Philosophy of Disenchantment' (1885) and 'The Anatomy of Negation' (1887), two works attempting a popular exposition of the theories of Schopenhauer and von Hartmann. Among his novels are 'Mr. Incoul's Misadventure' (1887); 'The Truth About Tristrem Varick' (1888); 'Eden' (1888); 'The Pace that Kills' (1888); 'A Transaction in Hearts' (1889); 'Enthralled' (1894); 'When Dreams Come True' (1895); 'The Yellow Fay' (1905); 'Historia Amoris' (1906); 'The Lords of the Ghostland' (1907); 'Daughters of the Rich' (1909); 'The Crimson Curtain' (1916); 'The Paliser Case' (1919).

SALTUS, Francis Saltus, poet, linguist and musician: b. New York City, 1849; d. Tarrytown, N. Y., 24 June 1889. He was an elder brother of Edgar Everston Saltus (q.v.). He was educated at Columbia College and spent many years abroad He made himself master of 10 different languages and contributed to magazines and newspapers a large number of sketches and poems in English, French, German and Italian under his own name and his pen name, "Cupid Jones." He was an accomplished musician. He published four comic operas and a comic history of the United States. At his death he left the completed manuscript of 'The Witch of Endor,' 50 long poems on biblical subjects, 'Flask and Flagon,' 'Poems of Places,' 'Pastels and Profiles,' 'Flower and Thorn,' 'Flesh and Spirit,' 'Moods of Madness,' an unnamed volume of French poetry and two volumes of humorous poetry. In prose he left 'A Life of Donizetti,' 'A Life of Rossini,' 'Kings of Song,' 'Great Baritones,' 'Romance of the Opera,' monographs on Bellini and Mercadante, a musical dictionary, and more than a thousand musical sketches. He also left comic histories of France, Greece, Germany, England and Rome, a comic 'Robinson Crusoe,' and a large number of comic sketches. After his death his poems were edited in four volumes by his father.

SALTVILLE, Engagement at. The extensive salt works at this place, in southwestern Virginia, furnished that State, the adjacent States of the South and the Confederate armies their supply of salt. Not until the third year of the war did the Union forces make any serious efforts to destroy these works. On 2 May 1864 General Crook started from Charlestown, on the Kanawha, to join General Sigel in the Shenandoah Valley, and one column of 2,600 cavalry, under General Averell, was directed upon Saltville to destroy the works, and was afterward to rejoin the main column under Crook. After a very difficult march through the mountains Averell reached Tazewell Court House, where he learned that Saltville was well defended by earthworks and artillery, and was held in strength by Gen. W. E. Jones, whereupon he abandoned the idea of an attack, and, after a severe engagement at Wytheville on the 10th, joined Crook at Union on the 15th.

Late in September 1864 Gen. S. G. Burbridge with a mounted force of about 5,000 men, advanced through eastern Kentucky to Prestonburg and up the Louisa Fork of the Big Sandy on Saltville. He was met 23 miles from Saltville by a small brigade of Confederate cavalry, which delayed him two days, thus enabling General Breckinridge to gather about 3,500 men at Saltville, so that when Burbridge appeared before the place, 2 October, he found the salt works well defended, with Breckinridge in command. He made an immediate attack and was stubbornly resisted, but after a hard struggle he gained the right and centre of the Confederate works. The Confederate left resisted all his efforts, and at 5 P.M. Burbridge withdrew from the contest, and abandoning his dead and wounded, marched all night toward Prestonburg, thence continuing his retreat. The Union loss was 54 killed, 190 wounded and 104 captured. The Confederate loss was much less. On 12 Dec. 1864 General Stoneman, with 5,700 men, started from Bean's Station, Tenn., on a raid into southwestern Virginia. He attacked Saltville and carried it on the 20th, burned the town and destroyed the salt works. (See STONEMAN'S RAID). Consult 'Official Records' (Vols. XXXVII, XXXIX, XLV); Pond, 'The Shenandoah Valley'; Van Horne, 'History of the Army of the Cumberland' (Vol. II); The Century Company's, 'Battles and Leaders of the Civil War' (Vol. IV).

SALTZMANN, Karl. German painter: b. Berlin, 23 Sept. 1847. He was a pupil of Goldschmied and of the marine painter Hermann Eschke. He made a trip round the world in the train of Prince Henry of Prussia and later became professor in the Academy at Berlin. His principal works are 'Dawn by the Sea' (1874); 'Entrance into Harbor of Colberg'; 'Harbor of Valparaiso' (1882); and 'Saved' (1884).

SALUS, sā'lŭs, in Roman mythology the goddess of health, prosperity and public welfare.

SALUTATION, any mode of greeting or of kindly or respectful or reverential address, by word or gesture when persons meet, whether equals with equals or inferiors with superiors. The lowest class of salutations, which merely aim at giving agreeable bodily sensations, are compared by Tylor ('Early History of Mankind,' ch. iii), to the tokens of kindliness exchanged among the lower animals: such are patting, stroking, kissing, pressing noses, blowing, sniffing, etc. Among American Indians one mode of greeting consists in rubbing each other's arms, breast or abdomen and their own; to the same class belong the pattings and slappings of the Fuegians. The Andaman Islanders salute by blowing into another's hand with a cooing murmur; Charlevoix tells of an Indian tribe on the Mexican Gulf who blew into one another's ears, and a similar usage was found existing in Equatorial Africa by Du Chaillu. The kiss is by no means what it has been by some authors reputed to be, a universal and instinctive act of salutation: it is unknown over half the world, and there the prevailing usage is that of smelling or sniffing, called "rubbing noses." Darwin finds this custom existing among the New Zealanders and Linnæus among the inhabitants of the Lapland Alps; but it is the custom of Polynesians, Malays, the populations of Indo-China and the Eskimos. In ancient Greece it was customary to kiss the hand, breast or knee of a superior; in ancient Rome the kiss was a token of civility and was a customary mode of salutation among kinsmen and close friends. In the early Christian Church the kiss was a sign of fellowship, and Saint Paul in four places of his epistles and Saint Peter in one make such mention of the "holy kiss," as proves it to have been customary in the assemblies of the faithful. In the Roman Catholic Church the "kiss of peace" is to this day exchanged among the clergy after the consecration of the elements in the solemn high mass; but it is not practised by the laity in the nave of the church. The kissing of the feet was from very early times a customary mode of doing homage; it still continues in a modified form in the papal court, where the person who comes into the presence of the Pontiff kisses the golden cross upon his sandal. The custom of kissing among men appears to have persisted in England till the middle of the 17th century; it still exists in the countries of continental Europe. Sovereigns on meeting kiss each other on both cheeks, and in the World War French generals bestowed kisses similarly when presenting the *croix de guerre* to soldiers of any grade who had signally distinguished themselves. In many European countries the servant kisses the hand of master or mistress; and there remains a trace of this custom in the Spanish language, in the formula used at the close of a letter, equivalent to "your obedient servant," *beso a Vmd. las manes,* "I kiss your worship's hands." The embrace is almost universal: it is used by the rude Andaman Islanders, the Blackmen of Australia, the Fuegians, as it was used by the Patriarch Jacob or by Philœtius and Eumæus when, on recognizing Ulysses (*Odyssey,* Dryden, xxi),

> Around his neck their longing arms they cast,
> His head, his shoulders, and his knees embraced;

or as it is still used among highly cultured people. The attitude of covering or crouching in presence of a superior is seen represented in all the sculptures of ancient Egypt and Assyria; and in barbarous countries it still persists, as in Dahomey or in Siam; little different is the self-abasement of a Siberian peasant in presence of a noble. Bowing in sign of reverence may range all the way from Jacob's bowing himself to the ground seven times to do honor to Esau, and the gesture little more than a nod practised in modern society. Clasping hands was among the ancient Romans, as among us, customary among acquaintances; it is a custom not very widely diffused, but in late years it has been introduced among rude peoples, such as Australians, Hottentots and Fuegians through their contact with European traders and missionaries. The familiar words of greeting differ but little among modern civilized peoples. Our "Good morning and "How do you do?" have their equivalents in the other European languages. But in German countries wherever the population is chiefly Catholic a current form of salutation, especially among peasants, is *Gelobt sei Jesus Christus,* and the response, *in Ewigkeit. Amen* (Praised be Jesus Christ for evermore. Amen). In Ireland it is, or used to be, a custom among simple folk for one on entering a house to pronounce the benison, "God save all here," and the response would be, "God save you kindly, sir (or ma'am)." The biblical "Peace to thee and to thine house" is still in use among the Moslem: *Salam 'alaikum. Wa- 'alaikum as-salam* (Peace be on you. And on you be the peace). The salutation of the ancient Greeks both at meeting and parting was Χαῖρε (be joyful); the Romans used two words, both signifying "be in health" or "be well"; on meeting their word was *Salve,* at parting *Vale.* The English phrase Good-by is the remnant of the ancient pious formula, God be wi'ye, and answers to the French Adieu, Spanish A'Dios, Italian Addio, etc.

SALUTES, Military, an essential form of discipline regulated and enforced by military law. All officers salute on meeting and on making or receiving official reports. Military courtesy requires the junior to salute first or when the salute is introductory to a report made at a military ceremony or formation to the representative of a common superior, as for example to the adjutant or officer of the day, the officer making the report, whatever his rank may be, is required to salute first; the officer to whom the report is made will acknowledge by saluting that he has received and understood it. When under arms the salute is made with the sword or saber if drawn, otherwise with the right hand, and a mounted officer always dismounts before addressing a superior who is not mounted. On official occasions officers, when indoors and under arms do not uncover, but salute with the sword, if drawn, and otherwise with the hand. If not under arms they uncover

and stand at attention, but do not salute except when making or receiving a report.

When an enlisted man without arms passes an officer he salutes with the right hand, and officers are to be saluted whether in uniform or not. When armed with the saber and out of ranks an enlisted man salutes with the saber, if drawn, but otherwise with the hand. If on foot and armed with a rifle or carbine he salutes with his weapon. A mounted soldier dismounts before addressing an officer not mounted. An enlisted man, if seated, rises on the approach of an officer, faces him and salutes; if standing he faces the officer for the same purpose. If both remain in the same place or on the same ground such compliments need not be repeated, and soldiers, if at work, do not cease work to salute an officer unless addressed by him. Before addressing an officer an enlisted man salutes as prescribed, and he also makes the same salute after receiving a reply. Indoors and unarmed an enlisted man uncovers and stands at attention on the approach of an officer. He does not salute unless he addresses or is addressed by the officer. If armed he salutes as though outdoors.

When an officer enters a room where there are soldiers the word "attention" is given by someone who perceives him, when all rise and remain standing in the position of soldier till the officer leaves the room; but soldiers at meals do not rise. Officers are required to at all times acknowledge the courtesies of enlisted men by returning salutes given, and when several officers in company are saluted, all who are entitled to the salute return it.

SALUTES WITH CANNON. The salute to the Union — one gun for each State — is fired at noon of the Fourth of July at every military post and on board commissioned naval vessels belonging to the United States. The National Salute of 21 guns is the salute for the National flag, the President of the United States, presidents of foreign republics or sovereigns of foreign states visiting the United State. The Vice-President of the United States and American and foreign ambassadors are saluted with 19 guns; the president of the Senate, Speaker of the House of Representatives, members of the Cabinet, the chief justice, a congressional committee, governors within their respective States or Territories, viceroy or governor-general of provinces belonging to foreign States, general of the army, admiral of the navy and same ranks in foreign armies and navies, 17 guns; American or foreign envoys, or ministers plenipotentiary, assistant secretaries of the navy or war, lieutenant-general or a major-general commanding the army, and corresponding ranks in the navy and foreign armies and navies, 15 guns; ministers-resident accredited to the United States, major-general, rear-admiral and corresponding ranks of foreign armies and navies, 13 guns, and chargé d'affaires, brigadier-general, commodore and corresponding ranks in foreign armies and navies, 11 guns. Consuls-general accredited to the United States receive a salute of nine guns.

Salutes are only fired between sunrise and sunset, and not on Sundays, except in international courtesies. The national colors are always displayed at the time of saluting. The salute to the flag is the only salute which is returned, and this must be done within 24 hours. United States vessels do not return the salute to the flag in United States waters if there is any fort or battery there to do it. Nor do United States vessels salute United States forts or posts.

If there are several batteries or forts within sight or six miles of each other, one of them is designated as the saluting fort, and returns all salutes of foreign men-of-war. In New York, Castle William, on Governor's Island, is the saluting fort.

SALVADOR (in official documents, **EL SALVADOR**), the smallest and most densely populated of the Central American republics, is bounded on the north and northeast by Honduras, on the southeast by the Gulf of Fonseca, on the south by the Pacific Ocean and on the west by Guatemala. Its area is usually given as 7,225 to 7,325 square miles. The capital, San Salvador, is situated in the valley of Las Hamacas, on the Acelhuate River, 2,115 feet above sea-level. Frequent disasters have taught the inhabitants the art of building earthquake-proof structures, with utilitarian rather than æthetic motives; nevertheless the desire to secure good architectural effects reasserts itself (notably in the design of the National Palace); there are pleasant parks, and efforts are being made to complete the paving and the drainage system.

Physiography.— On the northern frontier rises the great mountain chain, the Sierra Madre or Cordillera, with peaks 7,000 to 8,000 feet high, in which primitive rocks predominate. About 15 miles from the coast and running parallel with it is a range composed of plutonic material. Both systems include transverse ridges; the latter, the Coast Range, is intersected by the valleys of the Lempa and Grande rivers, and in or near it are situated the volcanoes San Vicente (7,683 feet), San Salvador, Santa Ana, San Miguel, Usulután, Apaneca, Izalco, Sociedad and Chinameca (4,200 feet). Izalco is almost continuously active. Earthquakes are of frequent occurrence: the capital has been wrecked by them 12 times since 1539, and is, in fact, "so subject to rockings and tremblings of the earth as to have acquired the name of the swinging hammock." The best natural harbor is that of La Unión, but it is not yet connected with the capital by rail. Acajutla, El Triunfo, La Concordia and La Libertad are the other ports. The largest lakes are Güijar (15 miles long by five wide) and Ilopango (nine miles by three); the chief rivers are the Lempa, the Paz and the San Miguel.

Political Divisions and Cities.— The republic of Salvador is divided into 14 departments, subdivided into districts, and these into towns and municipalities. The political subdivisions of the republic, with their capitals and populations, are shown in table on following page.

Fauna and Flora.—Among the native animals are the deer (*Cervus mexicanus*), armadillo, the jaguar and its little brother called ocelote on the coast, the pecari (*Sus americanus*), puma or American lion (*Felis concolor*), tapir, coyote (*Canis aureus mexicanus*), etc. We mention, among the avifauna, the

DEPARTMENTS	Capitals	Populations of capitals (approximate)
San Salvador	San Salvador	75,000
La Libertad	Nueva San Salvador	15,000
Sonsonate	Sonsonate	15,000
Ahuachapán	Ahuachapán	15,000
Santa Ana	Santa Ana	40,000
Chalatenango	Chalatenango	10,000
Cuscatlán	Cojutepeque	10,000
Cabañas	Sensuntepeque	12,000
San Vicente	San Vicente	12,000
La Paz	Zacatecoluca	7,500
Usulután	Usulután	7,500
San Miguel	San Miguel	25,000
Morazán	Gotera	5,000
La Union	La Union	5,000

quetzal (*Trogon splendens*) and among reptiles the lagarto or caiman (*Crocodilus americanus*), the iguana and the boa constrictor. Dr. Guzmán calls attention to the "surprising vitality of the vegetable kingdom" and gives an interesting list of medicinal and dye plants, together with those he classed as textile, oleaginous and alimentary. The balsam, which the Indians call Hoitziloxitl and which is commonly known as "balsam of Peru" although it is produced only in this part of Central America; the indigo and maguey (*Agave americana*) may well head such list.

Mineral Resources, Soil and Climate.— In a report devoted to mining operations, the consul-general of the United States writes from San Salvador: "For this republic a report can only be made on the production of gold and silver. While a number of promising copper fields are known, almost nothing has been done as yet in their development." In 1916 the authoritative statement was made that the output of gold and silver "amounts to about $1,500,000 annually." The soils on the slopes of mountains, table-lands and in the valleys, formed by the detritus of the rocks and decomposed vegetable matter, are remarkably fertile. The year is divided into two seasons — the rainy months being those from May to October, the dry from November to April. Low coast lands are hot and unhealthful; a comparatively cool and agreeable climate is found in the highlands of the interior.

History.— In the summer of 1524 Pedro de Alvarado invaded the territory now called Salvador, coming from Mexico by way of Guatemala. The Indian capital, Cuscatlan, was captured the following year. On 4 April 1528 the city of San Salvador was founded, but it became necessary to abandon the site originally chosen in favor of the present one, and the transfer was made in 1539. As a subordinate part of the viceroyalty of Guatemala, Salvador continued to be a Spanish possession until 1821. Between 15 Sept. 1821, when Guatemala severed her connection with Spain, and 1824, when the Central American confederation was formed, Salvador was compelled to assent to the annexation of her territory by Mexico. After the federation had dissolved (1839) Morazán tried to reunite the five small states of which it had been composed; in September 1842 he was made prisoner and shot at San José, Costa Rica. In 1885 the President of Guatemala, Gen. Justo Rufino Barrios, made an effort to restore the old relations between the states in the northwestern part of Central America. He also failed. On 13 Aug. 1886 Salvador promulgated the constitution which is now in force, displacing (it is expressly stated in the final clause) the constitution of 1883. The most important single fact in the history of the little republic, as in that of Guatemala (q.v.), is the survival of the Indian element in undiminished force. Educated Salvadorians of the present day, when writing of the sufferings of the natives during the period of Spanish supremacy, unconsciously refer to the wrongs *sustained*, not *inflicted*, by their own ancestors. (It is desirable to add, in view of the diversity of usage, that the forms "Salvadorian" and "Ecuadorian" seem to be preferable to "Salvadoran" and "Ecuadoran.") In February 1913 President Araujo was assassinated. On the conclusion, in 1915, of the term for which Dr. Araujo had been elected, the distinguished Carlos Meléndez took office for the term 1915–19. For Salvador's interest in the canal treaty between the United States and Nicaragua (Treaty Series, No. 624, Washington 1916) see NICARAGUA and NICARAGUA CANAL. The most important subjects inviting the attention of the Meléndez administration were educational and financial.

Government.— By the constitution "legislative power is vested in a body called the National Assembly of Deputies," which meets in February, each year. Deputies, three from each department, are elected by the people. "Executive power is vested in a citizen who shall have the title of President of the Republic"; his term is four years; he cannot be re-elected until after the expiration of a second period of equal duration. The vice-president is also chosen for four years. Secretaries or ministers are appointed by the President, the portfolios being: Foreign Affairs, Public Instruction and Justice; Interior, Promotion and Charities; Finance, Public Credit and Agriculture; War and Marine. "Judicial power is vested in a Supreme Court of Justice, in Chambers of third and second instance," etc. Each of the 14 departments has its governor and deputy governor (Constitution of the Republic of El Salvador, 13 Aug. 1886, IX, Art 3), whom the Executive appoints. Municipalities are governed by officers chosen by the people.

Diplomatic and Consular Service.— The United States has at the capital, San Salvador, a minister, a consul-general, a vice- and deputy-consul; Great Britain sends a minister and consul-general, a consul and (at San Salvador and La Unión) a vice-consul. El Salvador maintains a minister in Washington and has a consul-general at San Francisco and consuls in New York and New Orleans. In Great Britain El Salvador has a chargé d'affaires and consul-general, with consular agents at London, Liverpool, Glasgow, Southampton, Newport, Brighton and Birmingham.

Population, Education and Religion.— The census of 1 March 1901 showed, as the total number of inhabitants, 1,006,848, of whom 772,200 were mestizos, ladinos and whites and 234,648 Indians of pure blood. In 1917 population was given as about 1,700,000. Under the constitution (Art. 33), "teaching is free. Primary

instruction is compulsory. The instruction given in the establishments supported by the state shall be laical and gratuitous.» Besides the ordinary six-year elementary schools, rural schools have been established which give a brief course of instruction covering three years and provide not only for the children of the white people but also for native Indians. About 31,000 students and pupils are enrolled at the institutions of learning of various grades: the university, the normal and high schools and the 700 primary schools. On 6 April 1919 a school for rural teachers was opened in the city of Santa Ana, in which will be given lectures on methods of carrying out the official program of public instruction. Article 12 of the constitution provides: «The free exercise of all religions is guaranteed, the only limit being that which considerations of morality and the public order prescribe.»

Agriculture.— Nearly all of the high valleys and table-lands of the republic are well adapted to agriculture, which is, therefore, the principal occupation of the inhabitants. Products are coffee, indigo, rubber, cacao, balsam, tobacco and a variety of grains, seeds and fruits. In regard to coffee, the following statistics were prepared by the government: Area planted in coffee trees, 153,517 acres with 95,000,000 trees; virgin lands suitable for growing this crop, about 50,000 acres; average bearing life of a coffee tree in Salvador, 30 years and average production, 350 grams. The shipments of coffee from the republic to foreign countries in 1915 and 1916 amounted to 80 per cent in the value of the total exports; in 1914 their aggregate was 34,666 tons — other exports being sugar (1,008 tons), indigo (134 tons), hides (178 tons), leaf tobacco (33 tons), balsam (71 tons) and gold and silver ($1,481,772). Most of the 1917 coffee crop was damaged by the earthquake and volcanic eruption of 7 June 1917. Other agricultural products are cheese, beans, upland rice, corn and sugar. The government is encouraging cotton-growing by bounties on exports. Efforts are also being made toward wheat cultivation and tree planting is encouraged. There are in Salvador 281,013 head of cattle, 74,336 horses, 21,457 sheep and 422,980 pigs.

Commerce.— In 1917 the imports subject to duties aggregated $2,719,095 and the exports amounted in the same year to $10,588,900. The trade is chiefly with the United States, the United Kingdom and France. The principal imports in 1916 were cotton, hardware, flour, silk goods and yarn. The chief exports in the same year were coffee, 35,585,498 kilos (Kilo = 2.04 pounds), valued at $23,297,003 silver dollars; indigo, balsam, $298,498; tobacco $30,566; and sugar $646,528. Of the total coffee exported, 20 per cent went to the United States; 20 per cent to Norway; 2 per cent to Holland, 29 per cent to France; and 4 per cent to Great Britain.

Banking and Finance.— The government's estimate of public revenues in the budget for 1915–16 was 10,800,000 pesos. Memorandum number two, by the delegation of El Salvador (Proceedings of the First Pan American Financial Conference, Washington 1915, pp. 629–634) gives the import revenues of 1913 as 7,263,-042.98 silver dollars or pesos and of 1914 as only 6,076,770.61, showing a loss of 1,186,272.37 pesos in the first year of the war. The delegates add: «Before the world crisis, the monetary situation of Salvador was good (because the banks had been obliged, under governmental decree, to bring up their silver reserves at the time of the failure of the so-called Banco Nacional, which had no connection whatever with the government). As a matter of fact, the capital of the three banks now doing business is 6,000,000 pesos. They may issue double their capital in notes, on condition of having on hand 40 per cent (Banco Occidental and Agrícola Comercial) or 50 per cent (Banco Salvadoreñe). In our national budget there is always an item called 'public credit,' which has varied in the last few years from 3,000,000 to 4,000,000 silver dollars or pesos, for the amortization of the English loan and of the domestic loan and for the payment of the respective interests involved.»

The message of the President of Salvador to the National Assembly in the *Diario Oficial* of 20 Feb. 1917 contained a statement of the revenues and expenditures of the country during the year 1916, which showed a more favorable condition of affairs than at any time since 1913. The revenues of Salvador during those four years, in silver pesos (peso = .3978, fluctuating), were as follows: 1913, 13,734,133 pesos; 1914, 12,423,752 pesos; 1915, 10,625,174 pesos; 1916, 12,779,082 pesos, showing that in the last year the downward tendency was checked and an increase of 2,153,908 pesos over the previous year was reached.

The revenues and expenditures in the year 1917 are shown, as follows:

REVENUES	Pesos	EXPENDITURES	Pesos
Import duties	5,856,185	National assembly	120,405
Export duties	1,963,317	Executive	84,309
Tax on liquors	2,653,966	Government	2,603,929
Stamps and sealed paper	501,680	Promotion (fomento)	1,292,715
Miscellaneous revenues	816,404	Agriculture	63,105
Direct (income) taxes	269,365	Foreign relations	205,932
Interest	718,165	Justice	823,968
		Public instruction	1,174,386
		Philanthropy	630,760
		Treasury	833,956
		Public credit	1,597,579
		War and marine	3,037,038
Total	12,779,082	Total	12,468,082

The President called attention to the revenue of 137,794 pesos derived from the income tax established last year, to be increased by 74.-670 pesos in late collections. Payments on the national debt during 1916 amounted to 2,168,-572 pesos silver. The President pointed out the need of an established monetary system to prevent fluctuations in the foreign exchange and recommended measures for new coinage. The monetary system is based on a silver standard; the peso, divided into 100 centavos, containing 25 grammes of silver .900 fine. The par value of the peso in currency of the United States is normally 0.3978, and the value of $1.00 is 2.51345 pesos.

Railways, Roads, Shipping, Etc.—A narrow-gauge railway line connects the port of Acajutla with the capital, San Salvador, 65 miles; a branch line extends 25 miles to Santa Ana; and other branch lines connect Santa Tecla with the capital and Santa Ana with Ateos. According to the Pan American Union's *Latin America*, page 42, «the system of the International Railways of Central America which is intended to connect the Salvadorian port of La Unión with ports in Guatemala is under construction.» The total length of railway open is 210 miles, all of narrow-gauge. Great improvements has been made during the last 10 or 12 years in the methods of constructing highways and other roads which facilitate travel in the interior. There are 1,467 miles of good road in the republic. Over 400 steamers enter the ports of the republic annually; regular steamship connection is maintained with Salina Cruz on the north, Corinto on the south and intermediate ports; through steamers between San Francisco and Panama call at the ports of Acajutla, La Libertad and La Unión when traffic warrants; and, in order to stimulate maritime commerce, subventions have been given at different times to several important steamship companies. There are 117 post offices, 203 telegraph offices, with 2,521 miles of wire and 176 telephone stations, with 2,074 miles of wire.

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MARRION WILCOX.

SALVAGE, the act of saving a ship or goods from extraordinary danger, as from fire, the sea, an enemy, pirates or the like. In commercial and maritime law: (1) A payment or compensation to which those persons are entitled who have by their voluntary efforts saved ships or goods from extraordinary danger, as from fire, the sea, an enemy, pirates, or the like. The amount of salvage to be paid is generally agreed on between the salvors and the owners of the property salved; but if they cannot agree, the sum to be paid, and the proportions in which it shall be paid, are determined by the Admiralty Court. The crew of a ship are not entitled to any salvage for any extraordinary efforts they may make in saving their own vessel. (2) The property saved from extraordinary danger by the voluntary efforts of the salvors. See ADMIRALTY LAW.

SALVARSAN AND NEOSALVARSAN. The term salvarsan is used commercially as the equivalent of dioxydiamido arsenobenzol, the formula for which is $C_{12}H_{12}O_2N_2As_2$. It is popularly known as 606 because its originators Ehrlich and Hata made that number of experiments and combinations with arsenical preparations before arriving at salvarsan. Its discovery was announced in the early part of 1911. It is also known as the Ehrlich-Hata preparation. The active element in this combination as indicated in the formula is arsenic of the tervalent form, the quinquevalent form being much less potent as a spirochætocide. The aim and the hope of Ehrlich in his long series of patient efforts was to find a substance which in a single dose at a single blow should overpower syphilis (q.v.) a goal which he termed therapia magna sterilisans. A very ambitious project, almost an impossibility, and yet he barely missed it.

In the experimental work in which apes had been successfully syphilized with cultures of Spirochæta pallida, contrary to the belief that animals could be inoculated with syphilis, Ehrlich's dream had been partially realized. Apes, including chimpanzees, had been sterilized, that is, they had been cured of experimental syphilis with a single dose of salvarsan but in human beings this cannot be done. Still salvarsan is one of the greatest of human achievements in the field of therapeutics.

Remarkable results, not cures, have been obtained and may still be obtained with a single dose of salvarsan, especially if the disease is treated in the very early stage, but to produce such a profound effect as is implied in the *cure* of syphilis would require a larger dose than could be tolerated by a human being, it would produce a poisonous and probably a fatal result.

Salvarsan is prepared as follows: Sodium amalgam (28.8 grams of 4 per cent sodium) is added to 30 cubic centimeters of water and 32 cubic centimeters of 2*N*-acetic acid containing 4.98 grams of 3-amino-4-hydroxyphenylarsenious oxide. A yellow precipitate is produced. When the amalgam has been used up there is added 25 cubic centimeters of 2*N*-acetic acid and 28.8 grams more of the sodium amalgam. This procedure is once more repeated, when the reduction will be complete. The precipitate is then dissolved in 60 cubic centimeters of methyl alcohol, and the calculated amount of methyl-alcoholic hydrochloric acid is added. The salvarsan hydrochloride is then precipitated by adding ether after filtering.

Commercial salvarsan is a pale yellow, bulky, micro-crystalline powder which is permanent when dry, but highly oxidizable in air, and decomposes in aqueous solution, and especially in those which are alkaline, even in the absence of air. It dissolves readily in water, methyl-alcohol, ethylene-glycol, and glycerol and sparingly in ether and acetone. It has an alkaline

reaction. As found on the market it is generally mixed with impurities, and is quite variable as to its content of arsenic. For therapeutical use it must be dissolved in distilled, *not in boiled water,* for it has been found, or at any rate supposed that the albumen from the organisms in the water which has been boiled for the solution would vitiate the action of salvarsan when introduced into the body. Unlike mercury it may not be taken by the mouth nor rubbed into the skin by means of an ointment. It is used entirely by injection, three methods being possible, the subcutaneous, the intramuscular and the intravenous. The subcutaneous method has been practically abandoned for the substance remains within the tissues as an infiltrate, without producing any appreciable effect upon the spirochetes which are the cause of the disease. In fact it becomes a distinct source of harm, and cases have repeatedly been reported in which it has resulted in abscess and extensive neurosis of tissue.

Intramuscular injections have been approved by some physicians and discarded by others. The large muscles of the gluteal region are usually selected for this purpose and the injection into them is made deeply. The objections to this method are the intense and persistent pains which follow the injections and the continuance for a prolonged period of the infiltrations. These infiltrations do not terminate in suppuration but the salvarsan may become disintegrated and cause arsenical poisoning.

The form of injection which now receives the approval of the majority of experienced syphilographers is the intravenous.

The veins at the bend of the elbow are selected for the injection, the skin being first carefully sterilized. A tourniquet is secured around the arm and the injection is made into either of the veins which are thereby distended. After the operation of injection has been accomplished the wounded vein must be carefully dressed, this precaution being an important one.

It is also very important that the injection should not be made as a matter of office routine, but in the patient's house, or in a hospital where all necessary appliances are at hand. The patient should remain in bed from 24 to 48 hours after he has received the injection. The reaction which may be expected from an intravenous injection of salvarsan usually consists of slight elevation of temperature, chill, fever, headache and vomiting.

The quantity af salvarsan which should be used in an injection is from 0.4 to 0.6 gram. Death has been attributed to arsenical poisoning in some of the fatal cases, as large a quantity as three or more grains of arsenic having been liberated into the body by the disintegration of the injected salvarsan.

It is quite apparent that the danger which attends the intravenous method is much greater than that which attends the intramuscular. Contra-indications to the use of salvarsan are heart disease in various forms, including aneurysm and dilatation, myocarditis and uncompensated valvular disease. It should not be used in cases of advanced nephritis, nor in those cases of tertiary syphilis in which the cerebral and meningeal symptoms are threatening, in arterio-sclerosis nor in the presence of high fever. Blindness and deafness have occurred after the injection of salvarsan but they have usually cleared up after a suitable course of treatment with mercury. It is now believed that syphilis cannot be cured with salvarsan alone but that it should be used in conjunction with mercury, except possibly in primary syphilis. "Sodium salvarsan," prepared by precipitating with alcohol a solution of salvarsan in aqueous sodium hydroxide in the presence of a stabilizer (such as sodium hydrosulphite, mannitol or other polyhydric alcohols), has proved satisfactory in the ambulatory treatment of syphilis. "Copper salvarsan," prepared by adding sodium hydroxide to a solution of salvarsan and a copper salt, has been found useful in the treatment of "sleeping sickness."

Neosalvarsan or **Novarsenobenzol.**— The untoward results which attended the use of salvarsan induced Ehrlich to continue his experiments in the hope of discovering a substance by which they might be obviated. In October 1911 he introduced Neosalvarsan or "Ehrlich 914" (the number indicating the total in the series of his experiments, from the beginning), a condensation product of formaldehyde, sulphoxylate of sodium and salvarsan. Its distinct advantage over salvarsan is that it is neutral in reaction, salvarsan being alkaline.

It is a dry powder which is readily soluble in water or preferably in a dilute solution of sodium chloride.

It is used by injection either intramuscularly or intravenously, and will not cause infiltrations like salvarsan, nor will it cause necrosis of the veins into which it is injected, nor will it produce the severe pain which is caused by salvarsan. Because of its neutral reaction it will modify or abolish certain distressing symptoms which have frequently followed the use of salvarsan including vaso-motor disturbances and congestions which have sometimes resulted in collapse, œdema of the face, diarrhœa, colic, etc. Larger doses of this substance may be used than of salvarsan of which it contains 66 per cent. It is always safer, however, to begin the treatment with a small dose, especially in women, and increase them as the indications may warrant. Thus the limits of dosage may be placed between 0.3 and 1.5 gram. The contra-indications are the same as for salvarsan.

A pronounced advance in the treatment of syphilis and kindred disorders has been made possible by the development of two other neosalvarsans, known as "Galyl" and "Ludyl," respectively, "No. 1116" and "No. 1151" of Mouneyrat's series. The first is an acidic substance dissolving in aqueous sodium carbonate to a neutral solution, and as such, very suitable for intravenous injection in the treatment of syphilis and other protozoal diseases. Ludyl is prepared by the Schotten-Baumann reaction from benzene-*m*-disulphonic chloride of salvarsan. Both galyl and ludyl, as used in the treatment of syphilis, have a very energetic spirillicidal action, while being but feebly toxic and well tolerated in the system. There is no apparent congestive action of the organs of the body following their use, and no secondary ill effect on the nervous system; while their action upon the blood and general nutrition is favorable.

Under the use of these substances, especially when combined with mercury, the symptoms of syphilis rapidly improve, and the Wassermann test, which should be repeated every month or two, will indicate the progressive destruction and disappearance of the spirochetes.

There is no definite time limit within which salvarsan or neosalvarsan, in connection with mercury, should be used; it may be a year; it may be much longer. A persistent negative Wassermann reaction indicates the disappearance of the cause of the disease, but just when this limit will be reached it will be impossible to predict in any given case. The use of salvarsan and the neosalvarsans has also been extended to the treatment of relapsing fever, scarlet fever, malaria and various nervous diseases including cholera.

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SALVATIERRA, săl-vä-tē-ĕr'rä, Mexico, city in the state of Guanajuato, on the Rio Lerma, and the Celayo-Acambaro railroads, 50 miles southwest of Queretaro. The chief industry is cotton-spinning. Pop. 14,322.

SALVATION ARMY, The. The story of The Salavation Army is the story of an aggressive religious organization that has won its way around the world entirely on its own merits and has built itself up from what had hitherto been regarded as most unpromising material. The Army is organized on military principles, with a view to reaching the non-churchgoing masses of the world. It was first started in July 1865, in the East End of London as the Christian Mission. Thirteen years later, at Christmas 1878, it received the name of The Salvation Army. Since then its growth throughout the world has been phenomenal. The late Gen. William Booth (q.v.), its well-known father and founder was born in Nottingham, England, on 10 April 1829; d. London, 20 Aug. 1912. In 1852 he entered the ministry of the Methodist Church and became a powerful evangelist, attracting immense crowds and witnessing thousands of conversions. Finding, however, that the churchless masses could not be reached by ordinary methods, he resigned his pastorate and established the Christian Mission which afterward developed into The Army. In this he was ably assisted by his wife, Catherine Booth, who was familiarly known as the Mother of The Salvation Army. She was born in 1829 and died on 4 Oct. 1890. She was regarded by many as the most eloquent and powerful woman speaker of the century and did more than any other to open up the way for women to preach the Gospel. The absolute equality of women as leaders, officeholders and preachers became one of the cardinal planks in The Army platform. As a temperance movement the value of the work of The Army cannot be over-estimated. It has been said that The Salvation Army has been the means of converting hundreds of thousands of confirmed drunkards. As total abstinence is a condition of membership, this can be readily understood.

The international headquarters of The Army are in London. Its world-wide operations are carried on in 61 countries and colonies, embracing 9,673 posts, under the charge of 23,200 officers and employees, with 61,685 local officers, 28,-150 brass bandsmen. Eighty periodicals are published in 35 languages, with a weekly circulation of about 205,000. There are 1,173 social relief institutions and 615 day schools in the world, under the charge of nearly 3,100 officers and employees. About 7,399 fallen women annually pass through the 119 rescue homes and from 80 to 90 per cent of these are permanently restored to lives of virtue. About 2,701 ex-convicts pass annually through the prison gate homes. There are 147 slum settlements in the poorest districts of great cities, the worst dives, saloons and tenements being regularly visited. The number of annual conversions in connection with the spiritual work have averaged from 225,000 to 275,000 during the past 10 years, making a total of approximately 2,500,000, of whom not less than 250,000 were converted from lives of drunkenness.

The headquarters of The Salvation Army in America are in New York. Commander Evangeline Booth, daughter of the founder of The Army, is in charge of the work. A separate territory has been formed of the country west of the Mississippi, under Commissioner Thomas Estell, with headquarters in Chicago. The first party of officers, under Commissioner George Railton, landed in New York in March 1880.

The social relief work of The Salvation Army rose, without deliberate plan, to meet certain immediate needs. After 25 years of application The Salvation Army has trained a large body of men and women who are experts on all questions of social relief. Municipal governments in all parts of the country call its officers to council on the problems of poverty and unemployment and the criminal and its various homes in many cities are considered necessary parts of the corrective system. The Prison work of The Salvation Army has made long strides during the last 10 years and its prison department is assuming considerable worth to the parole boards of several States.

Training colleges for cadets have been established for the training of officers in New York and Chicago.

The principal literature of The Salvation Army includes the following books: 'Darkest England,' 'Religion for Everyday' and 'Training of Children,' by General William Booth; 'Servants of All' and 'Bible Battle Axes,' by Bramwell Booth and the 'Life of Catherine Booth,' the 'Life of Consul Emma Booth Tucker,' by F. Booth Tucker; 'Helps to Holiness' and 'When the Holy Ghost is Come,' by Col. S. L. Boeagle. Its weekly papers are the *War Cry,* with a circulation of 70,000, the *Strids Ropet* (Swedish War Cry), 9,000 fortnightly and the *Young Soldier,* 38,000, issued for children.

SALVATOR, one of the names of the monitor lizard; and also applied to a South American lizard, the teju (q.v.).

SALVE REGINA, săl'vē rę-jī'na, the first words of a prayer addressed to the Mother of Christ, in Roman Catholic religious services. The words are also applied to the music used in connection with the prayer.

SALVIA, a large genus of the *Labiatæ,* occurring in temperature or warm regions, sev-

eral living in the southwestern United States. They range in size from herbs to shrubs, in foliage from entire to pinnatifid leaves and in inflorescence, from axillary to panicled. The flowers are sometimes two inches long and of nearly every hue except yellow; and the floral leaves are often changed into colored bracts, adding to their brilliance. The genus is remarkable for the arrangements made for cross-fertilization. The blossoms have a two-lipped corolla, two rudiments of stamens and two polliniferous stamens. The latter stand at the entrance to the throat of the flower, have short immovable filaments and a very long connective between the two anther cells of which the lower is abortive. This connective is crescent-shaped, the horns pointing outward and rocks upon the filament in such a manner that a bee entering the blossom pushes back the lower arm and brings down the other on its back, so that the pollen-filled anther cell deposits part of its contents there.

Salvia officinalis, the common sage (q.v.) and many others are cultivated either for savory herbs or for their flowers; or, as in the Clarys (*S. selarea*), for colored bracts; or, as in *S. argentea,* for its wholly white foliage.

SALVINI, säl-vē'nē, **Tommaso,** Italian tragedian: b. Milan, 1 Jan. 1829; d. 1 Jan. 1916. He began his studies at Florence but showing a talent for acting, his father, who was an actor, put him under the instruction of Gustavo Modena and at 16 he entered upon his stage career. In 1849 he left the stage to take part in the war of Italian independence, was made a corporal and served throughout the siege of Rome. He returned to the stage the following year and acted in the company with Adelaide Ristori. He soon began the study of those parts that he later played with such success, orosmane in 'Zaïre,' 'Oreste,' the 'Saul' of Alfieri and Shakespeare's 'Hamlet' and 'Othello.' His success in Italy was such as to warrant him in looking abroad for honors and he next appeared at Paris where the critics were equally enthusiastic in his praise. In 1865 he took part at Florence in the celebration of the 600th anniversary of the birth of Dante, reciting pasages from the 'Divine Comedy.' He played in various cities of Spain and in 1871 went to South America to play at Montevideo, Buenos Aires and Rio de Janeiro. In 1873 he appeared for the first time in the United States, enacting Othello at the Academy of Music, New York, 16 September. In 1875 he appeared in London. He afterward played in many parts of Europe and again in America in 1880, his supporting company being American actors, speaking English while he spoke Italian. He has made five visits in all to the United States; in one of these (1886) playing Othello to Edwin Booth's Iago and the Ghost to the other's Hamlet. He retired from the stage in 1891. Besides parts already mentioned he has appeared with distinction in the Egisto of Alfieri's 'Merope'; Palo in 'Francesca da Rimini'; Œdipus in a play of that name written for him by Nicolini; Conrad in 'La Morte Civile'; in 'Sampson, the Gladiator,' 'Macbeth,' 'King Lear,' 'Coriolanus,' and finally in 1891 at Florence as Iago. Consult Winter, William, 'Shadows of the Stage' (New York 1892); id., 'The Wallet of Time' (ib., 1913); 'Leaves from the Autobiography of Tommaso Salvini' (London and New York 1893).

SALVINIA, a genus of an aquatic family (*Salviniaceæ*) of cryptogams. They are floating plants, widely distributed in warm regions and not far removed from the ferns. *S. natans,* common in southern Europe and tropical America, has a sparingly branched stem lying on the water and develops three leaves at each node; two of these float as oval, green, and papillose foliage, hairy underneath, while the submerged third is divided into numerous hairy filaments, hanging like tassels in the water and metamorphosed into absorptive organs, that appear to be true roots, but are not. The spherical sporocarps, or sori, are borne near the junction of these filaments with the stem and are generally in groups of three, each enclosed in a cuplike growth from the filament, like the indusium of a fern and enclosing unisexual sporangia. The sporangia are composed of either microspores or macrospores. The microspores form antheridia and liberate spermatozoids which fertilize the archegonia developed by the macrospores. Several species of the *Salviniaceæ* are useful in aquaria.

SALWIN, säl'wēn, **SALWEEN,** or **SALUEN,** Burma, the most important river of the country. It has its source in the Tanla Mountains, south of the Kuen Lun, drawing also from the Kara Nor, some of its water. At its source, it is known as Nagtschu, and consists of the united volume of water coming from the glaciers of the mountain streams rising on the Tibetan plateaus. Its name among the Chinese is Lu-Tse-Kiang. The Burmese call it Thanlwin. About 160 Kilometers from its mouth appear many dangerous rapids, a great menace to navigation. The current is variable. It is a wild and picturesque stream, whose aspect varies greatly in the dry and wet seasons. After the rains the water washes high up the slopes against the trees of the forests; the average difference between high and low water amounting to from 50 to 90 feet. In the lower part of its course, islands also obstruct navigation (not visible at high water). The worst part is the gorge between the Yônzalin and Kyankhnyat rivers. Many ferries are used to cross the river and at these points villages are built on the heights above. There are a few bridges in Chinese territory. The Salwin's chief tributaries are the Nam Yu, Nam Oi, Hsipa Haw, Nam Nim, Nam Ting, Nam Kyek, Nam Nang, Nam Koa, Nam Hka and Nam Pang—its largest tributary,—the Nam Hsim, Mê Sili and Mê Sala; the Nam Hang, Nam Pan, Nam Teng, Nam Pawn, the Thaung-yin and the Yônzalin. The Salwin cuts the British Shan states almost in two. Kyodam, the great timber depot, lies 30 miles below the junction of the Thaung-yin and the Salwin. A cable stretched across the river at this point catches all the timber (teak), which is made into rafts and floated down to Kado near Maulmein (where the revenue is collected). From Kyodan southward and as far as Shwegôn, 63 miles from Maulmein, boats and steamers of light draft can safely navigate. The area of the Salwin Basin is 62,700 square miles. Its length 800 miles, breadth from one to four miles.

SALZBRUNN, zälts'broon, Germany, a group of three villages (New, Lower and Upper Salzbrunn), in Prussian Silesia, 30 miles southwest of Breslau. It is famous as a watering place and has eight mineral springs. The water is alkalo-saline. Many thousand bottles are exported annually and several thousand persons visit the springs in the season. The water is especially adapted to pulmonary complaints. There are various industrial works, including glass and porcelain factories, wool looms, coal mines and brickyards. Pop. 6,459.

SALZBURG, zälts'boorg, Austria, (1) capital of the duchy or province of that name, occupies a position of singular beauty on the Salzbach, 87 miles southeast of Munich. It lies in a valley from which tower the wooded slopes of the Salzburg Alps. The steep sides of the Mönchsberg rise from the midst of the town, rocky and rugged. In the ancient cemetery of Saint Peter, the vaults are hewn in rocky clefts. Many of the private and public buildings are handsome marble structures and are suggestive of the Italian. Shady promenades skirt the winding river. The cathedral is a fine specimen of Renaissance, built in 1614–28 in imitation of Saint Peter's. A monument to Mozart, who was born here, stands in Mozart-Platz. The present palace of the archbishops is an imposing edifice, opposite to which are the government offices and law courts. Across the river is the Mirabell palace, once the summer residence of the prince-archbishops. There are 24 churches, a theological seminary and schools, hospitals, fine libraries, a museum, riding schools, etc. Salzburg is a very popular summer resort, which contributes much to its development and progress. A park, theatre, art gallery and baths are among the most recent improvements. There are numerous benevolent and charitable institutions. Salzburg engages in a variety of small manufactures, such as musical instruments, marble ornaments, ironwares, cement, artificial wool, etc. Its trade is improving. Its origin and development were equally ecclesiastical, its archbishops German princes. The monastery and bishopric founded here (500–700) by Saint Rupert of Worms, was the nucleus of the present town. It has been the scene of several religious conflicts and is distinctively Catholic. Pop. about 38,000. (2) The duchy covers an area of 2,762 square miles. It is characteristically mountainous with longitudinal valleys intersecting the hills. Of the 200 lakes, Lake Zell is celebrated for its wondrous mountain panorama. It has many mineral and thermal springs and valuable mines and forests. Pop. about 200,000.

SALZMANN, zälts'man, **Christian Gotthilf,** German Protestant clergyman and educator: b. Sommerda, Thuringia, 1 June 1744; d. Schnepfenthal, 31 Oct. 1811. He was educated at Jena, served as pastor in 1768–81 and was teacher of morals and religion at the Philanthropinum, Dessau, in 1781–84. He was a believer in the natural religion, and the school which he established at Schnepfenthal was organized on especially broad principles. Salzmann held the theory that isolation was a requisite of moral education, was a determined opponent of many methods of teaching then in force and held the faults of the pupil to be justly credited to the master. His school attained a considerable reputation and was continued after his death. His writings on educational matters were extensive, most of them being in the form of fiction or of satire upon prevalent practice in instruction. Author of 'Krebsbüchlein' (1780); 'Karl von Karlsberg' (1780–86); 'Konrad Kiefer' (1794); 'Ameisenbüchlein (1806), etc. His collected works were published (12 vols., Stuttgart 1845–46). Recent editions are those of Wagner in 'Klassiker der Pädagogik' (1900) and Ackerman in 'Bibliothek pädagogische Klassiker' (1897–1901). Consult the 'Memoir' published by the school at its centennary in 1884.

SÁMAL, sä'mäl, an island of the Philippines in the northern part of Davao Bay forming the east shore of Pasiputan Strait, length 17 miles, width 13 miles, area 140 square miles. Its general elevation is 820 feet, some parts of the shores are low and wooded and other portions are high and rocky. The soil is fertile, and chocolate is the chief product; excellent timber is also obtained. The island is well populated, having seven small towns on its western coast.

SAMALES, sä-mä'lēz, (1) a small tribe of the Philippine Islands, living on the island of Samal in the Gulf of Davão, on the east coast of the island of Mindanao. They are of the Malay race. (2) The name sometimes given to the Moros inhabiting the islands between Basilan and Sulu, Philippines; they are also called Sámales-Laút.

SAMANA (sä-mä-nä') **BAY,** an indentation of the eastern coast of Santo Domingo, Haiti, 30 miles long and 10 miles wide. It affords an excellent harbor, being well sheltered and deep, capable of accommodating the largest vessels. The ports of Sanchez and Santa Barbara de Samana are on the north coast. The bay has an important position near the route from the United States to the Isthmus of Panama; in 1870 a treaty was negotiated providing for its purchase by the United States, which the United States Senate refused to ratify.

SAMAR, sä'mär, an island of the Philippines, the third in size of the archipelago. It lies southeast of Luzon, in the extreme northeastern part of the Visayan group and east of Leyte, from which it is separated by the narrow strait of San Juanico; length northwest and southeast 156 miles; width 75 miles; area 5,198 square miles, with dependent islands 5,488 square miles. A central mountain chain traverses the island from northwest to southeast, being divided near the centre by the valley of the Ulut River; there is also a group of mountains in the extreme northwest. Their height rarely exceeds 1,700 to 1,800 feet. The island has a number of rivers, of which the largest and most important are the Oras and Ulut on the east, the Bató on the north and the Gándara on the west, and there are four lakes. Among the natural curiosities is an arch over the Basey River formed by two limestone rocks from 34 to 40 feet high. In the rocks on the left a cave opens 37 feet above the water, which is 94 feet deep; it has been partially destroyed by the caving of the rocks overhead. The place is known

as the *Cuevas de Sojotón.* The soil is fertile and adapted to the production of all the staples of the Philippines; the most important products are hemp, sugar, rice and cocoanuts; the hemp product for export amounted to over 21,000,000 pounds in a single year. Coffee, chocolate, tobacco and wheat are also cultivated in abundance. A number of medicinal plants grow on the island, the most famous being the one producing the seed called "isigud," or the "fruit of San Ignacio," also known as "Catbalogan seed," because large quantities of it are grown near the town of Catbalogan. This is highly prized by the Chinese as an efficacious remedy for cholera. Valuable timber is found; bamboo and rattan are abundant, and wax and honey are obtained in large quantities. Coal, gold and copper are found in the mountains, but have not been mined. The raising of horses, cattle, hogs and goats is an important industry. Sugar and cocoanut-oil are manufactured and there are other manufactures for domestic use. Though there are few roads in the island there is good communication with the interior by means of the rivers which are navigable for native boats. There is also an extensive coastwise trade and trade with Manila. The people of Sámar are of Visayan blood, representing most fully the characteristics of the Malay race. They are, as a rule, industrious. Some native refugees, about 10,000, live in the mountains, practically independent and savage in their manner and customs. During the last insurrection there was an insurgent stronghold at Sojoton which was captured by United States troops in November 1901. The island of Sámar with its adjacent islands was constituted a province and placed under civil government in 1902, in accordance with the provincial government act of the Philippine Commission. Pop. 266,237.

SAMARA, sä-mä'rä, Russia, (1) capital of a province of the same name, at the junction of the Samara River with the Volga, 550 miles southeast of Moscow. It is the seat of a governor and of a bishop, and one of the main ports of the Volga. Its principal buildings are its churches — mostly Russian — convents, schools and seminaries; theatres, banks, industrial establishments, philanthropical institutions, public libraries and museums. Its manufactures include machinery, leather, soap, etc. There is an enormous trade in corn, hides and meat, fish and caviare and salt, and a large transit trade between Samara, Khiva, Bokhara and Tashkend. Three markets are held annually. The Koumiss health resorts are celebrated. Pop. 145,600. (2) The province of Samara, in the southeast, has an area of 58,321 square miles. At the north it consists of flat low tablelands, interspersed by deep river valleys. The chief streams are the Volga, Tcheremshan, Sok and Samara. The Zheguleff Mountains rise opposite the town of Samara, from the banks of the Volga. The remainder of the province is covered by low, flat steppes, excepting two spurs of the Obshchiy at the southeast. Agriculture and gardening are the chief occupations of the inhabitants, also stock-raising and bee culture. There is considerable domestic and foreign commerce. The principal fairs are held at Novouzensk and Bugulma. More than an average number of schools are provided. The Serghievsk mineral springs are much frequented. There is a large German colony. The chief towns are Samara, Bugulwa, Buguruslan, Buzuluk, Nicolayevsk, Novo-Uzeń and Stavropol. In 1889 Samara suffered from famine and a great plague and the Russian Red Cross Society cared for 100,000 people. Pop. 3,710,100.

SAMARANG, sä'mą-räng', Java, a seaport town on the north coast, 255 miles east of Batavia, the principal port for the trade of Middle Java, since 1873 connected at Surakarta with the Java Railway. The European quarters have all the appearance of a typical Dutch town. The more important buildings are a military hospital, the city hall (1854-64), Christian churches and schools. A fort and a coast battery provide defense for the town. The river is silted up at its mouth, but a canal, constructed in 1879, serves as a harbor. The roadstead is exposed during the west monsoon. Pop. (1905) 96,660, including 12,372 Chinese and 4,800 Europeans.

SAMARIA, są-mā'rĭ-ą, Palestine, (1) the ancient capital of Samaria, 36 miles northwest of Jerusalem, occupied the acclivity of an isolated and abrupt height — Mount Sameron, which is separated from the surrounding mountains by a rich and well-watered plain. The town rose in terraces from this plain to a height of 400 or 500 feet. Samaria was the capital of Northern Israel from the date of its foundation by Omri, about 925 B.C., to the time of its capitulation to the Assyrians 721 B.C. The site was selected by Omri for a stronghold and capital, as commanding two of the most important high-roads. The situation surpasses greatly that of Jerusalem, though not so picturesque. It commands, however, a charming view toward the Mediterranean, the mountains of Schechem and Mount Hermon. The most important ruins are those of the time of Herod. It was in Samaria that the 10 tribes of Israel founded their independent state after the revolt, perpetuating their mutual animosity by incessant warfare. Thus the name Samaritan became a term of bitter reproach. This antipathy was religious as well as political, but was later mitigated by the return of the Samaritans to the ancient form of worship, and by the erection of a temple, modeled after that of Solomon in Jerusalem, soon after Alexander the Great had passed through Syria. Samaria having been presented by Augustus to Herod, he rebuilt the city which had been the residence of all the kings of Israel till its overthrow by the Assyrians — calling the new temple Sebaste, in honor of the donor. An old church or mosque, once dedicated to John the Baptist, in the adjacent village of Sebastieh, marks the scene of that saint's burial or martyrdom. In the great World War the city was in the zone of military operations by the British against the Turks, resulting in the surrender of Jerusalem, 10 Dec. 1917, after being in possession of the Mohammedans, with two brief intervals, for more than 1,200 years. (2) Samaria, the name also given to the kingdom of Israel and the subsequent Roman province forming the central portion of Palestine stretching southward from the Plain of Esdraelon, declining south of Hebron, into the desert plateau of Et Tih.

SAMARITAN LANGUAGE AND LITERATURE, the tongue and literary productions belonging to the inhabitants of Samaria, a region in Central Palestine of indefinite boundaries, possessing a capital of the same name.

Samaritan Language.— The Samaritan language was formed of varied elements gradually collected and assimilated from the Hebrew, Chaldee and Syriac. Greek, Latin, Persian and Arabic also contributed words to this dialect which grew up among a people isolated and even secluded in some respects, but through whose territory passed the immemorial trade route which connected Egypt and Africa with Assyria and the far East. Thus roots and heterogeneous scraps of language were jumbled together in the vernacular of an illiterate people, whose grammar was irregular, whose orthography was uncertain; there appears a complete confusion between the gutturals and cognate letters severally; quiescents or silent vowels prevail, and while vowel sounds are uncertain that of a is the most prominent. When the Arabians conquered Palestine in the 7th century this language gave place to that of the conquerors excepting among the priests, where it survived as the language of religion and ritual; thus it shared the fate of Hebrew among the Jews, Latin in Italy and the Roman provinces and Sanskrit in Hindustan. Like all Semitic languages it is read from right to left and the alphabet consists only of consonants, namely, alaf, bith, gaman, dalat, i, ba, sen, it, tit, jud, kaph, labad, mim, nun, simcat, in, phi, sadi, goph, rish, shan, tav. The two vowels with which certain words begin have a slight consonantal value. There are no accents or other diacritical symbols and no vowel points as in other Semitic languages, but some consonants are used as vowels. The numbers are written as in Hebrew. The characters appear in two forms, one of which is found in manuscripts, the other being confined to engraved inscriptions.

Samaritan Literature.— The literature of the Samaritan people consists of many departments, including grammar and lexicography. Three grammatical treatises on the Samaritan language were published from a manuscript at Amsterdam in 1862. They expound the theories of certain Arabian grammarians, from whose philological works whole passages are copied word for word. The Samaritan pronunciation may be judged of by the transliteration of Hebrew words into Arabic. No Samaritan lexicon has yet come to light. The lexicography, therefore, of the language is in an inchoate condition. The nearest approach to a glossary is to be found in the fragments of 'Tardeschemans' (interpreters) Hebrew-Arabic dictionaries now preserved in the Imperial Library at Saint Petersburg. There are also at Paris in the Bibliothéque Nationale des Anciens Fonds a concordance of forms occurring in the Scriptures with the Arabic and Samaritan words in parallel columns. The Imperial Library at Saint Petersburg also possesses some Samaritan calendars, or astronomical tables. In legendary lore are several extant manuscripts. The British Museum possesses a 'Commentary on the Legends ascribed to Moses,' which is largely a compilation from Jewish sources. Of a similar character is the 'Jewelled Necklace in Praise of the Lord of the Human Race,' that is, Moses, who is credited with a divine nature, while great emphasis is laid upon the circumstances of his birth and the miracles he wrought. These two are typical of a somewhat extensive Samaritan legendary literature. The Samaritan commentaries on the Pentateuch are many in number and interesting as showing the doctrines of these people. It abounds in quotations from the Pentateuch, the prophets and the Mishna, and avoids all references to the Deity which imply an anthropomorphic conception. A number of fragments from the commentaries are also preserved at Saint Petersburg. The Samaritan 'Chronicle or Book of Joshua,' sent to Scaliger by the Samaritans of Cairo in 1584, seems to have revised and redacted into its present form about 1300 A.D. from four special manuscripts, three Arabic and one Hebrew, that is Samaritan. Among other things it relates that "King Joshua" waged war with 300,000 mounted men against two kings of Persia, and was succeeded on his throne by five "royal" rulers — the last being Sampson. The 'Chronicle of Abulfath' covers a period from Adam to Mohammed and is full of the wildest fables. Consult Uhlemann, 'Institutiones linguæ Samaritanæ' (Leipzig 1837); Petermann, H., 'Brevis Linguæ Samaritanæ Grammatica' (Berlin 1873); Gesenius, W., 'De Pentateuchi Samaritanæ indole' (Halle 1815); Brüll, A., 'Kritische Studien über Samaritanische Fragments in Oxford (Frankfort 1875); Kohn, S., 'Zur Sprache, Litteratur und Dogmatik der Samaritaner' (Leipzig 1876); id., 'Samaritanische Studien' (Breslau 1868); Cowley, 'The Samaritan Liturgy' (Oxford 1909).

SAMARITAN PENTATEUCH, an ancient version of the books of Moses, which has been preserved by the Samaritans, and along with the book of Joshua, constitutes their sacred scriptures. The Samaritan Pentateuch is most probably a recension of the same original as that from which the Jewish came, and possesses an independent value in determining the text. It is written in a non-Hebrew character, probably older than that of the Hebrew Septuagint. A manuscript copy of the Samaritan Pentateuch is in existence which is said by the Samaritans to have been written by Abishua, the great-grandson of Aaron. There are various other manuscript copies of this version, besides a translation of it in the Samaritan vernacular and one in Arabic, which after the 7th century superseded Samaritan as the language of the people. The work was known only through Origen, Jerome and other early writers until Pietro della Valle discovered a copy of it at Damascus in the 17th century. There are now several printed editions. See SAMARITAN LANGUAGE AND LITERATURE.

SAMARITANS, so called from the city of Samaria, the capital of the kingdom of Israel, and from Samaritis, the region adjoining that city. The policy of the Israelitish kings was, as a rule, to keep their subjects apart from too close association with the kingdom of Judah, and the breach between the two peoples was made wider, when, after the captivity of Israel, Assyrian colonists intermarried with the remnant left behind by the conquerors, and the

Samaritans ceased to be of purely Hebrew descent. The New Testament shows the aversion with which they were regarded by the Jews in the time of Christ, and even to this day when the Samaritans are represented by a few families still worshipping at Mount Gerizim, the dislike with which the Jews look upon them is as strong as ever. The Samaritans claim to be purely Mosaic in their creed, and that the Jews have departed from the ancient teachings of Israel. They worship one God, practise circumcision and the purifications, and keep the feasts, except the Purim and the feast of the Dedication. They look for a Messiah and believe in a resurrection from the dead and retribution in a future life for wrongs done in the present one. They marry among themselves only and practise polygamy in a limited degree. See also JEWS AND JUDAISM; JEWISH SECTS.

SAMARKAND, săm-ar-kănd′ (ancient, MARCANDA), Turkestan, Asiatic Russia, chief town of the province of the same name, and formerly capital of Sogdiana, in a fertile valley, 130 miles east of the city of Bokhara. The citadel stands at the west and beyond is the newly-built town. The Righistan, or main square, is of unrivaled beauty in its architectural features. The principal buildings are a palace, the bazaars, the Ulg-beg *madrasa,* or college; the tombs of Timur and his wives; two other colleges of the 17th century — splendid buildings, highly decorated with arabesques, enameled tiles of various colors, rich marble, and inscriptions of gold, etc., and 250 mosques. There is a brisk trade, and the chief items of commerce are cotton, silk, wheat, rice, horses, asses, fruit and cutlery. Gardening is the principal occupation, and there is some manufacturing. Wheat, rice and silk are exported, chiefly to Bokhara; silkwares, fine fruits, and rock-salt are imported. Samarkand has been for more than two centuries a great Asiatic mart. As Marcanda, it was taken by Alexander the Great; Timur made it his capital and in his time it contained a population of 150,000. In the 15th century it was celebrated as a school of astronomy and mathematics. It had a checkered history; taken in 712 by the Arabs, who introduced the creed and customs of Islam, it finally fell into possession of the Russians in 1868. Pop. of city (1910) 94,650; province (1914) 1,198,000.

SAMARSKITE, a rare and exceedingly complex, velvet black, nearly opaque mineral, occurring mostly massive, rarely in crystals. It is distinguished by its dark reddish-brown streak, splendent, vitreous to resinous lustre and conchoidal fracture. Its hardness is 5 to 6, specific gravity 5.6 to 5.8. Its usually rough crystals are rectangular prisms of orthorombic symmetry. It is a niobate (and tantalate) of iron uranium, and the cerium and yttrium metals. It is chiefly remarkable for the large number of rare metals which it contains, including samarium, terbium, gadolinium, and the doubtful mosandrum, decipium and phillipium. Its only European locality is Miask, Russia, but it is found sparingly in Canada, also in the United States in Connecticut, Maryland and Colorado. The only localities of commercial importance are in North Carolina.

SAMBOURNE, săm′born, **Edward Linley,** English cartoonist: b. London, 4 Jan. 1845; d. 3 Aug. 1910. He was educated at the City of London School and Chester College, and at 16 became an engineering draughtsman. In 1867 Mark Lemon, editor of *Punch,* accepted a small drawing from his hand, and he soon formed the connection that lasted through life. In 1871 he was given a seat at the table and in 1901 he succeeded Sir John Tenniel as chief cartoonist. He had practically no artistic education, but developed for himself an original style after first showing some inclination to the methods of Leech and Keene. He displayed ingenuity and firmness of touch, and a classic feeling for line. He was perhaps the least humorous of the *Punch* artists, being weighted with a strain of seriousness and dignity. He illustrated Burnand's 'New History of Sanford and Merton' (1872); Kingsley's 'Water Babies' (1885); 'Hans Andersen's Fairy Tales' (1887), etc.

SAMBRE, sänbär, river of France and Belgium, a tributary of the Meuse. It rises in the northern part of the French department of Aisne, flows between steep and rocky heights, receives several smaller streams, and finally, after a very tortuous course, empties at Namur into the Meuse. The Sambre is 110 miles long. It is navigable from Landrecies for 148 kilometers, and from that point for 67 kilometers is canalized, having 10 locks. The Sambre Canal passes southward as far as Oise, connecting the Seine and Maas. Practically the vicinity of the entire length of the river in France formed a vast battlefield after the Teutonic armies had invaded France in the early part of the great World War.

SAMBUKE, an ancient musical instrument; though applied sometimes to several musical instruments of different kinds, such as a lyre, a dulcimer, a triangular harp or trigon and the large Asiatic and Egyptian harps.

SAMBUR, a large deer (*Cervus unicolor*), widely distributed throughout southeastern Asia, and especially the hill country of India and the species of most importance to the sportsman. Large bucks approach five feet in height at the withers, and may exceed 500 pounds in weight. The antlers are large and rough, have the brow-tine sprouting at an acute angle with the beam instead of at or near a right angle, and dividing into two subequal tines at the extremity; the beam sometimes exceeds 40 inches in length in fine specimens from the Bay of Bengal. The color is properly a uniform deep brown, but paler and less handsome hues are often seen; the hair is long and wiry, and forms an erectile mane on the necks of full-grown stags. This deer is an inhabitant of the woodlands, coming out to graze on the hill-slopes, at times, for like the wapiti it subsists mainly upon grass and herbage, but never far from a refuge in the jungle; yet at certain seasons browses the new twigs, or seeks for fruits. There is great variety in their circumstances and habits throughout the wide area of the distribution of this species, and consequently a puzzling amount of variation in their form and appearance, so that several separate species have been without good reason, as further study has shown. Consult Blanford, 'Mammals of India' (1888); Lydekker, 'Deer of All Lands' (1898).



SAMBUR (*Cervus Unicolor*)

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SAMARKAND, sām-ar-kānd' (ancient, MARCANDA), Turkestan, Asiatic Russia, chief town of the province of the same name, and formerly capital of Sogdiana, in a fertile valley, 130 miles east of the city of Bokhara. The citadel stands at the west and beyond is the newly-built town. The Righistan, or main square, is of unrivaled beauty in its architectural features. The principal buildings are a palace, the bazaars, the Ulu-beg *medrasa*, or college; the tombs of Timur and his wives; two other colleges of the 17th century—splendid buildings, highly decorated with arabesques, enamelled tiles of various colors, rich marble, and inscriptions of gold, etc., and 250 mosques. There is a brisk trade, and the chief items of commerce are cotton, silk, wheat, rice, horses, asses, fruit and cutlery. Gardening is the principal occupation, and there is some manufacturing. Wheat, rice and silk are exported, chiefly to Bokhara; silkwares, fine fruits, and rock-salt are imported. Samarkand has been for more than two centuries a great Asiatic mart. As Marcanda, it was taken by Alexander the Great; Timur made it his capital and in his time it contained a population of 150,000. In the 15th century it was celebrated as a school of astronomy and mathematics. It had a checkered history; taken in 712 by the Arabs, who introduced the creed and customs of Islam, it finally fell into possession of the Russians in 1868. Pop. of city (1910) 94,650; province (1914) 1,198,600.

SAMARSKITE, a rare and exceedingly complex, velvet black, nearly opaque mineral, occurring mostly massive, rarely in crystals. It is distinguished by its dark reddish-brown streak, splendent, vitreous to resinous lustre and conchoidal fracture. Its hardness is 5 to 6, specific gravity 5.6 to 5.8. Its usually rough crystals are rectangular prisms of orthorombic symmetry. It is a niobate (and tantalate) of iron uranium, and the cerium and yttrium metals. It is chiefly remarkable for the large number of rare metals which it contains, including samarium, terbium, gadolinium, and the doubtful mosandrum, decipium and philippium. Its only European locality is Miask, Russia, but it is found sparingly in Canada, also in the United States in Connecticut, Maryland and Colorado. The only localities of commercial importance are in North Carolina.

SAMBOURNE, sām'born, **Edward Linley**, English cartoonist: b. London, 4 Jan. 1845; d. 3 Aug. 1910. He was educated at the City of London School and Chester College, and at 16 became an engineering draughtsman. In 1867 Mark Lemon, editor of *Punch*, accepted a small drawing from his hand, and he soon formed the connection that lasted through life. In 1871 he was given a seat at the table and in 1901 he succeeded Sir John Tenniel as chief cartoonist. He had practically no artistic education, but developed for himself an original style after first showing some inclination to the methods of Leech and Keene. He displayed ingenuity and firmness of touch, and a classic feeling for line. He was perhaps the least humorous of the *Punch* artists, being weighted with a strain of seriousness and dignity. He illustrated Burnand's 'New History of Sanford and Merton' (1872); Kingsley's 'Water Babies' (1885); 'Hans Andersen's Fairy Tales' (1887), etc.

SAMBRE, sänbär, river of France and Belgium, a tributary of the Meuse. It rises in the northern part of the French department of Aisne, flows between steep and rocky heights, receives several smaller streams, and finally, after a very tortuous course, empties at Namur into the Meuse. The Sambre is 110 miles long. It is navigable from Landrecies for 148 kilometers, and from that point for 67 kilometers is canalized, having 10 locks. The Sambre Canal passes southward as far as Oise, connecting the Seine and Maas. Practically the vicinity of the entire length of the river in France formed a vast battlefield after the Teutonic armies had invaded France in the early part of the great World War.

SAMBUKE, an ancient musical instrument; though applied sometimes to several musical instruments of different kinds, such as a lyre, a dulcimer, a triangular harp or trigon and the large Asiatic and Egyptian harps.

SAMBUR, a large deer (*Cervus unicolor*), widely distributed throughout southeastern Asia, and especially the hill country of India and the species of most importance to the sportsman. Large bucks approach five feet in height at the withers, and may exceed 500 pounds in weight. The antlers are large and rough, have the brow-tine sprouting at an acute angle with the beam instead of at or near a right angle, and dividing into two subequal tines at the extremity; the beam sometimes exceeds 40 inches in length in fine specimens from the Bay of Bengal. The color is properly a uniform deep brown, but paler and less handsome hues are often seen; the hair is long and wiry, and forms an erectile mane on the necks of full-grown stags. This deer is an inhabitant of the woodlands, coming out to graze on the hill-slopes, at times, for like the wapiti it subsists mainly upon grass and herbage, but never far from a refuge in the jungle; yet at certain seasons browses the new twigs, or seeks for fruits. There is great variety in their circumstances and habits throughout the wide area of the distribution of this species, and consequently a puzzling amount of variation in their form and appearance, so that several separate species have been without good reason, as further study has shown. Consult Blanford, 'Mammals of India' (1888); Lydekker, 'Deer of All Lands' (1898).



SAMBUR (*Cervus Unicolor*)

SAMIAN WARE, the name of a kind of ancient Greek pottery made of Samian earth, or to a variety of Roman pottery made in imitation of this. The vases are of a bright red or black color, covered with a lustrous silicious glaze, with separately molded ornaments attached to them.

SAMNITES, an ancient people sprung from the Sabines, and inhabiting the province of Samnium, in Lower Italy. They were divided into four nations: 1, the Caraceni in the north, capital, Aufidena; 2, the Pentri in the centre, capital, Bovianum, who constituted the most powerful nation of the Samnite stock; 3, the Caudina in the southwest; 4, the Harpini in the south, capital, Beneventum. The Samnites are described in Roman history as a people fond of war and of liberty, who were brought completely under the Roman yoke after long and bloody wars, which continued with few interruptions 53 years. After the most fatal defeats, and the entire devastation of their country, the Samnites, together with the other nations which had assisted them, found themselves obliged to submit to the supremacy of Rome, 290 B.C. When the Italian allies of Rome revolted against her in the year 90 B.C. the Samnites once more rose against their oppressors, and fought with desperation. But Sulla entirely subdued them, and commanded that every Samnite should be put to death. Three days after the battle he ordered 4,000 of them who had been taken prisoners to be put to death on the Campus Martius. The few that remained lived from that time scattered in villages. The Samnites cultivated various arts and manufactures, for the proximity of the refined Greeks in Lower Italy had a very beneficial influence upon them. Even their laws and constitution were borrowed in a great degree from the Greeks. Their form of government was democratic. At the commencement of a war they were accustomed to choose a common general.

SAMOA DISASTER, The. See SAMOAN ISLANDS.

SAMOAN ISLANDS, The, or SAMOA, formerly known as the Navigator Islands, an important group in the South Pacific Ocean, belonging till 1914 partly to Germany and partly to the United States. They are about 2,000 miles south of the Hawaiian Islands, in an almost direct line between San Francisco and Australia and extend from about lat. 13° to 15° S., and from long. 168° to 173° W. They lie 2,410 miles north of Auckland, New Zealand, and about 4,200 miles southwest of San Francisco. The group comprises 14 islands, of which only Savaii (700 square miles), Upolu (500 square miles), Tutuila (200 square miles) and the Manua group (26 square miles) are important. The total area is about 1,700 square miles. The climate is tropical, with abundant rainfall and a mean temperature of 80° in December and 70° in July.

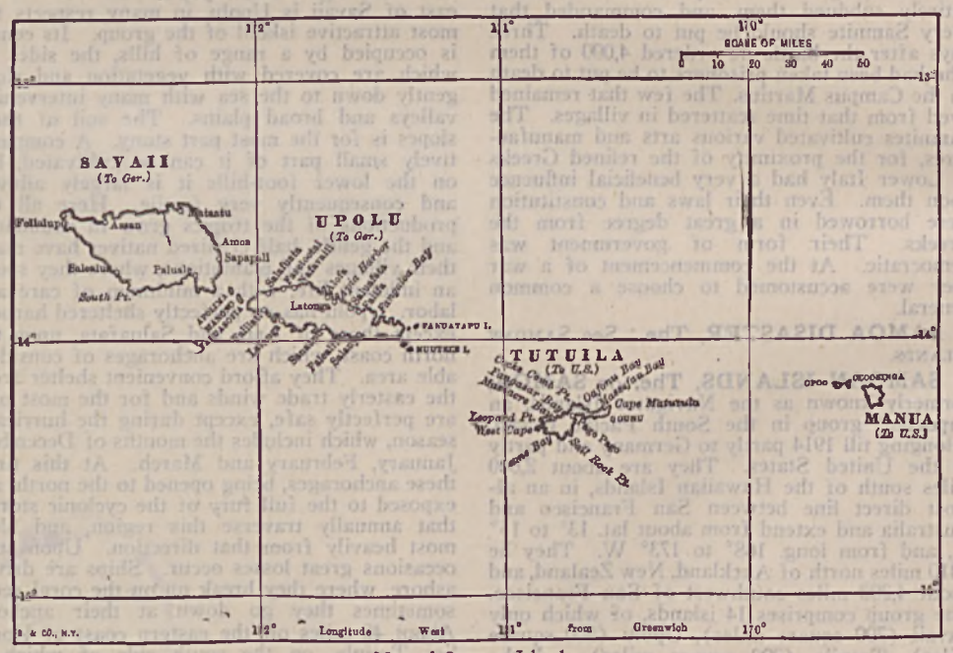
All the islands are peaks of a submarine chain of volcanic mountains. Barrier reefs encircle the large islands more or less, and especially Upolu. Brown and bare in many places at low water, the reefs are submerged at high tide, when the surf booms and bursts upon them in miles and miles of snowy whiteness. Between the outer reef and the shore stretches a lagoon of multi-tinted waters, varying in width from 200 yards to two and three miles. This generally smooth belt of water is, in effect, a canal encircling the islands and is the highway along which all intercourse is had between different points of the islands. In the interior lofty mountains rise, leaving broad stretches of comparatively level land bordering the shore and reaching up to low-lying foot hills. Water courses extend down the mountain side through which the tremendous rains, turning into furious torrents in a few minutes, have cut great ravines. In many places the sides of the mountains are not far from perpendicular. Yet such is the climate that they are held in place by the network of growth that covers them. Over such a surface is spread a tropic forest of often giant trees.

Savaii, the most westerly member of the Samoan group is much the largest and most rugged. It is ridged with lofty, cloud-encircled mountains that are covered with a mantle of dense tropical foliage, giving to them an evenness of outline that delights the eye of the newcomer. The interior of the island, which has never been explored and concerning which little is known, is wholly occupied by mountains. Only a small strip of alluvial land bordering the shore is productive and the island is capable of sustaining a small population. Ten miles east of Savaii is Upolu, in many respects the most attractive island of the group. Its centre is occupied by a range of hills, the sides of which are covered with vegetation and slope gently down to the sea with many intervening valleys and broad plains. The soil of these slopes is for the most part stony. A comparatively small part of it can be cultivated, but on the lower foot-hills it is largely alluvial and consequently very fertile. Here all the productions of the tropics grow in abundance and the gentle, half civilized natives have made their villages and plantations, where they spend an indolent life, with a minimum of care and labor. Upolu has no perfectly sheltered harbors except those of Apia and Saluafata, upon the north coast, which are anchorages of considerable area. They afford convenient shelter from the easterly trade winds and for the most part are perfectly safe, except during the hurricane season, which includes the months of December, January, February and March. At this time, these anchorages, being opened to the north, are exposed to the full fury of the cyclonic storms that annually traverse this region, and blow most heavily from that direction. Upon such occasions great losses occur. Ships are driven ashore, where they break up on the coral reef; sometimes they go down at their anchors. About 40 miles off the eastern coast of Upolu lies Tutiula, on the south side of which is Pango-Pango harbor. This is the only land-locked anchorage in the group and affords protection in all kinds of weather to the largest men-of-war or ocean vessels. The land around the harbor is level and well adapted for wharves, warehouses or other structures. It is more suited to steamers than to sailing vessels, since the heavy trade winds sometimes blow directly into the entrance, making it difficult for vessels under sail to leave it. But as a harbor for steamships it probably has no equal among the thousand islands of the Pacific. It lies, moreover, directly in the great circle track between Australia and America, and is, there-

fore, a convenient calling place for vessels traversing the Pacific.

Within the sea reef of Upolu lies the island of Manono, little more than a barren rock, which has played a great part in the domestic history of the group. It has always been the cradle of a feudal aristocracy and the focus of native politics. Its chiefs have held a commanding influence in all Samoan affairs. The Manua Islands, three in number and of small area, are 60 miles east of Tutuila. Although they are properly classed with the Samoan group they have little in common with the three larger islands already mentioned save in their language and origin.

The Samoans belong to the so-called brown people or Malayo-Polynesians. Although they have always been considered as having affinities with the Malays of the Indian Archipelago, nothing is positively known about their origin. That they are a branch of the Malay race or family is not much questioned and they are also remotely allied to the Malagasy of Madagascar. The parent race has disappeared; but that branch from which the Samoans are descended was one of its earliest offshoots, and having remained almost free from admixture of blood, nearly represents the original. They trace back directly to the great Aryan family



Map of Samoan Islands.

and their ancestors centuries before the present era emigrated from India and established themselves in the Indian Archipelago, whence they afterward pushed further on into the Pacific. Never having been subject to the inroads of other alien races, and the consequent admixture of blood, the Samoans have preserved uncorrupted and unchanged many of their original racial characteristics. They are of splendid physique, handsome, bright, strikingly erect, sound, healthy, vigorous and of tremendous strength. Many of the distinctive marks of the European appear in their faces, giving that melancholy air and meekness which Humboldt first pointed out as a characteristic of the islanders of the Pacific. Their skin is dark olive, resembling polished copper, presenting no difference in the sexes, though the prominent chiefs and better families are much lighter, with smoother skin. They are also taller and more symmetrical in person than the common people. The infant is much lighter in complexion than the adult. The male Samoan is tall, erect and proud in bearing, with smooth, straight and well-rounded limbs, the contour seldom presenting muscular protuberance or development. Females are generally slight, especially the young girls; erect and symmetrical, easy and graceful in their movements, the charm of light-heartedness seeming to follow every action. Beauty of feature is not the rule; though many of the village maids are exceedingly attractive.

The Samoans build primitive houses, stone fences and canoes, and in war time dig ditches, throw up earthworks and construct forts and palisades. They cultivate the yam and taro and to some extent, since the advent of the whites, collect cocoanuts and make copra; they manufacture cloth and mats and engage in fishing and in collecting the food that nature offers to them freely for the gathering. The faleteles or council houses features of all the villages, in many instances are of imposing dimensions. The houses are built of the wood of the bread-fruit tree. They are slightly oval, some 25 or 30 feet high. In building them three centre posts are raised, which support a ridge pole, while cross beams are lashed in at different heights, thus binding the structure firmly together. A thatching of sugarcane or pandanus leaves covers the roof. Large houses generally have prominent sides; the smaller ones are open all around, but are curtained by mats.

The first Christian missionary visited Samoa in 1830. In 1903 nearly every native had embraced the Christian religion. Food is collected on Friday and prepared on Saturday. On the Sabbath scarcely a boat is to be seen; the hunter is never in the woods. Attendance upon church meetings affords almost the only sign of life; even the sports of the children are sacrificed, in a large degree, to the strict observance of the day. To a stranger the villages seem deserted. Three denominations have been established in Samoa and there has been strong rivalry between them. All the churches have good schools, those of the London Missions and of the Catholic Church being especially well conducted and prosperous. At Malua, on the coast of Upolu, 12 miles to the west of Apia, the London Missionary Society maintains a settlement or college founded by the Rev. Dr. Turner. The establishment consists of a house for the principal, or resident missionary, a large building which is used as church and schoolroom, and a number of cottages standing in regular order round an open place or square. At Leulumoenga is a college, established about 1890 for the purpose of educating the sons of the chiefs and of teaching them English. Roman Catholics took the initiative in teaching English. The Protestant missionaries, at first, declined to admit natives who desired to learn English into schools attended by whites and half-castes, nor would they teach English in the native schools. Later they erected near Apia a fine high school or college for Samoan girls of the upper class.

In education the Samoans have displayed quite as marked proficiency as in their assimilation of Christianity. Probably fully one-half of all persons over 20 years of age can read and write. Under that age, all of both sexes, with but few exceptions, are educated to that extent. Beyond this, and the addition of elementary arithmetic, education does not extend, save to those in the mission schools, who are preparing themselves for the ministry. Samoans are keenly alive to all the advantages of education. Every village, without exception, has its resident pastor, or faife'au. This person is at once minister and teacher, regularly teaching the village school besides attending to his ministerial duties. In like manner each village is provided with a building that serves for the purpose of schoolhouse as well as church.

Cotton, sugar, coffee and cocoanuts are the leading articles of trade in the islands. The copra of commerce is obtained by drying the kernel of the cocoanut, the copra, which is exported to Europe and the United States, where it is used in the manufacture of cocoanut oil.

History.— The islands were first visited by whites in 1721. The French explorer, De Bougainville, named the group in 1768. In 1787 John F. G. de la Perouse spent several weeks in and around the islands; his experiences with the natives were not altogether agreeable, for on the island of Tutuila Captain de Langle, the second in command of the expedition, with several sailors, was massacred. In 1839 the famous expedition of Commodore Charles Wilkes, of the United States navy, made the first thorough survey and exploration of the principal islands of the group. Wilkes also negotiated an agreement with the principal chiefs by which the interests of the natives and the whalers and traders visiting the islands from time to time were provided for. He appointed a consul to represent the United States and took measures to insure amicable relations in the future between the islands and the United States. This agreement was the beginning of treaty connections between the Samoans and the outside world. A third of a century elapsed after Commodore Wilkes' visit before anything more formal or important developed in the relations of the islanders to the United States or to any European nation. Notwithstanding the steady development of commercial interests in the islands, no serious attempts were made by any nation to obtain a footing in Samoa. During this entire period, however, the islanders had a friendly disposition toward the United States, and later a coaling station at Pango-Pango was secured by the American government. The native government of the islands had been from time immemorial under the two royal houses of Malietoa and Tupea except on the island of Tutuila which was governed by native chiefs. In 1873 at the suggestion of former residents a house of nobles and a house of representatives were established, with Malietoa, Laupepa and the chief of the royal house of Tupea as joint kings. Subsequently Malietoa became sole king. In 1887 he was deposed by the German government on the claim of unjust treatment of German subjects, who formed the bulk of the foreign population of the island, and was deported first to German New Guinea and then to Kamerun, in Africa, and finally in 1888 to Hamburg. Tamasese, a native chief, was in the meantime proclaimed king by the Germans, though against the protest of the British and American consuls at Samoa. Mataafa, a near relative of Malietoa, made war on Tamasese and succeeded to the throne.

Meanwhile a commercial treaty was negotiated between a representative of the Samoan government and the United States Secretary of State, William M. Evarts, by which the claim of the United States to the harbor of Pango-Pango as a coaling and naval station was affirmed. Germany followed in the footsteps of the United States in negotiating a treaty, securing to that country practical control of the harbor of Saluafata. The same treaty also gave the Germans unusual commercial privileges and exceptional power in the adjustment of affairs between German residents at Apia and the Samoans. Great Britain also concluded a treaty, securing a naval station and coaling depot and other privileges.

In 1889 a conference between the representatives of the American, British and German governments was held at Berlin, at which a treaty was signed by the three powers guaranteeing the neutrality of the islands in which the citizens of the three signatory powers would have equal rights of residence, trade and personal protection. They agreed to recognize the independence of the Samoan government and the free rights of the natives to elect their chief or king and choose a form of government according to their own laws and customs. A Supreme Court was established, consisting of one judge styled the Chief Justice of Samoa. To this court were referred all civil suits con-

cerning real property situated in Samoa; all civil suits between natives and foreigners or between foreigners of different nationalities; all crimes committed by natives against foreigners or committed by such foreigners as are not subject to any consular jurisdiction. The capital was located at Apia. A commission was appointed to investigate titles to land alleged to have been purchased from the natives, and this in 1894 completed its labors, confirming about 75,000 acres of land to Germany, 36,000 to British and 21,000 to Americans.

By the agreement of 2 Dec. 1899 the Samoan Islands were divided between the United States, Germany and Great Britain. The latter, however, traded her claims to Germany for certain concessions in Africa and other places. Under this agreement the United States retained Tutulia and all other islands of the Samoan group east of longitude 171° west of Greenwich, while Germany obtained all the Samoan territory to the west of American holdings. The king of Norway and Sweden was made arbitrator to determine and adjudge the amount of claims due to citizens and subjects of British, German and American governments having possessions on the islands and affected by recent military operations there. German Samoa was administered by an imperial governor and a native chief assisted by a native council, while the American possessions were placed in charge of a naval governor. Shortly after the opening of the European War in 1914, an expeditionary force of New Zealanders captured German Samoa. By the terms of the Peace Treaty of May 1919 the German portion was placed under the administration of New Zealand. The German and the American fleets suffered very severely from a sudden tempest in the roadstead of Apia on 16 March 1889. The American losses were the *Trenton* and the *Vandalia*, and 52 men; the German losses, the *Adler* and the *Eber*, and 134 lives. A volcanic erruption in the interior of Savaii, which began in August 1905, continued until 1909, thus forming the greatest known volcanic disturbance in the world's history.

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SAMOKRISCHTCHINS. See RELIGIOUS SECTS.

SAMOS, sā'mŏs, now **SAMO, or SOUSAM-ADASSI,** an island in the Ægean Sea belonging to the Grecian Archipelago. It is 45 miles southwest of Smyrna, and is separated from the coast of Asia Minor by a narrow channel, Little Boghaz, and from Nikaria and the Furni Islands by the Great Boghaz. It covers an area of 213 square miles and has several good harbors on the coast; it is traversed by two rocky and barren mountain ranges, relieved by some forests of pines, with vineyards and olive groves on the lower slopes. The valleys are well-watered and fertile, and contain beautiful scenery. The capital and chief city is Vathy, on the north side. The old capital, Khora, is a poor place on the south side. This was the site of the famous temple of Hera. The island is extensively cultivated, produces excellent Muscadine wine, corn, fruit and vegetables. The minerals include silver, lead, antimony, calamine, manganese and copper. Samos is renowned as the birthplace of Pythagoras and other distinguished men. It was formerly inhabited by Ionian Greeks. The chief exports are wine, brandy, raisins, hides, leather, oil, tobacco and carob-beans. Samos was constituted a principality under Turkey, with the guarantee of France, Great Britain and Russia, 11 Dec. 1832. In November 1912 the island was seized by the Greeks and has since been held by them. The question of the Ægean Islands was further complicated by the Great War and local changes, and had not been settled by the middle of 1918; therefore Samos was still under Greek rule.

SAMOSATENES, or **SAMOSATIANS,** a heretical sect, followers of Paul of Samosata, bishop of Antioch, from 260 to 274 A.D. He denied the divinity of Jesus Christ, saying Jesus was simply man, though favored with the indwelling of the Logos from the instant of his conception: by the unvarying conformity of his will to the Divine will, he became like unto God, and through love he became one with him. His doctrine was condemned as impious by three councils of bishops, the third of which by decree deposed him, 269 A.D.; but Paul would not comply with the decree, till at last, after the overthrow of his great patron, Zenobia, queen of Palmyra, it was enforced by order of the Emperor Aurelian, 274 A.D., who declared that the controversy had been determined by the judgments of the bishops of Italy, and in particular the bishop of Rome. The Samosatenes are also called Paulinians and Paulianists.

SAMOTHRACE, sam o-thras, or sā-mō-thrā'sē, or **SAMOTHRAKI** (Turkish, Samadrek), an island of the Ægean Sea, about 40 miles northwest of the entrance to the Dardanelles, and nearly opposite the mouth of the Hebrus, 36 miles from the coast of Thrace. It is rugged and mountainous and of almost oval form; its highest summit, Saoce, reaches an elevation of 5,248 feet. On the northern coast are sulphur springs of considerable renown. The principal products are grain, wood, oil, honey and wax, and on the coast there is a considerable sponge fishery carried on by traders from Smyrna. In the northern part of the islands the ruins of ancient Samothrace were found (1873–75), consisting of Cyclopean walls; a Doric temple of marble and another of circular form. Samothrace was of importance from early times and is frequently mentioned in the works of Pliny, Homer and others. Here Poseidon witnessed the contests between Greeks and Trojans on the plains of Troy. But its chief renown was due to its having been the seat of worship of the Cabiri, and to its religious mysteries, supposedly derived from the Pelasgians. The island is once mentioned in history in connection with the expedition of Xerxes, one of its ships having taken a conspicuous part in the famous battle of Salamis. The island was first colonized by Phœnicians, afterward joined by Greeks. It always enjoyed autonomy, partly owing to its sacred character, partly to its lack of political importance — due to the fact of its having no good harbor. Saint Paul visited the island in the course of his second missionary expedition (Acts xvi, 11). The inhabitants are mostly Christians. Pop. 4,600. Samothrace, with all the other Ægean Islands, was in the possession of Greece and Italy in 1918, pending a definite arrangement with regard to their future control.

SAMOVAR, a Russian tea kettle, the water in which is boiled by means of hot coals contained in an iron tube, and then poured over the tea.

SAMOYEDES, săm'oi-dēz, or **SAMOIEDES,** a Mongolian people inhabiting the shores of the Arctic Ocean, from the Kanin Peninsula, on the eastern shores of the White Sea, in European Russia, to the Gulf of Khatanga, in the northeast of the government of Yeniseisk, Siberia. They consist of three principal tribes, speaking different dialects. Their origin is unknown, but they are supposed to have come from more southern regions, and have been erroneously confounded by the Russians with the Laplanders, whose country, called in the Lapland tongue, Sameanda has probably given them their name. They are nomadic and live chiefly by fishing, hunting and keeping reindeer. Their principal wealth consists in herds of reindeer, which supply them with food, clothing, tents, utensils, etc. They are of small stature, usually between four and five feet; have a flat, round and broad face, thick lips, wide nose, little beard, black hair, in small quantity. They are extremely superstitious and generally peaceable. They are unacquainted with the art of writing, their traditions being imperfectly preserved only in their songs. When Russian expansionists first became acquainted with them they had already been driven from their native seats by the Tartars, and separated from their kindred tribes.

SAMP, originally an Indian article of food consisting of maize, broken or bruised, which is cooked by boiling and eaten with milk.

SAMPAN, a boat of various build used on the Chinese rivers, in Straits Settlements and elsewhere, for the conveyance of merchandise, and also frequently for habitation. They are swift sailers both with oar and sail.

SAMPHIRE, an umbelliferous plant (*Crithmum maritimum*), pale-green with bi-triternate leaves and fleshy very succulent leaflets, and umbels of small yellowish flowers followed by fennel-like fruits. It grows wild along the rocky shores of northwestern Europe, near the water, and when abundant, is used as a pickle, salad or potherb. It can also be cultivated in gardens, if not too far from the coast, and if supplied with plenty of salt and soda solutions. The name is a corruption of the old French "herbe de Sainte Pierre," and it is also called in England Saint Peter's-wort.

SAMPLE, Robert Fleming, American Presbyterian clergyman: b. Corning, N. Y., 19 Oct. 1829; d. New York City, 12 Aug. 1905. He was graduated from Jefferson College in 1849. From 1853 he was engaged in various pastorates in Pennsylvania and Missouri until 1887 when he assumed charge of the Westminster Presbyterian Church, New York, where he remained and was pastor emeritus from 1902 till his death. He was professor of Christian ethics in Lincoln University, was editor of 'North and West' in 1895–1902, traveled widely in Europe and Palestine, and was connected with numerous religious educational and religious organizations. He published 'Early Dawn' (1861) 'Memoir of Rev. John C. Thorn' (1868); 'Beacon Lights of Reformation' (1889); 'Elements of Pulpit Power' (1901), etc.

SAMPLERS. A strip, or square of linen, or canvas, recording specimen stitches and patterns, was, for hundreds of years, worked by every young girl of aristocratic and well-to-do families. The sampler had the double value of giving the child skill as she worked it and of serving as a guide and source of reference all the rest of her life. The sampler ceased to become a part of education in the middle of the 19th century. After 50 years of oblivion, it came into prominence in a new way, to enjoy fame by appealing to the fancy of the collector. The first and finest collection was made by the late A. W. Drake and is now scattered. A splendid collection is in the South Kensington Museum, London. Although no earlier examples exist than the 17th century, the sampler, which is nothing more nor less than a pattern-book for the embroiderer, is probably as old as the art of embroidery (q.v.) itself.

The embroiderer was seldom the designer of the decoration that grew beneath her needle. The sampler was, therefore, a kind of notebook (corresponding to the artist's sketch-book), exhibiting various stitches and suggestions for embroidery, or for making cross-stitch letters, numbers, patterns, etc. It was, consequently, of both artistic and practical value. The name tells plainly what it is.

Chaucer uses the word *ensampler* as a synonym for pattern, and the poet Skelton (1469–1529) speaks of "the sampler to sew on, the lacis to embraid." The inventory of Edward VI (1552), mentions "a sampler, or set of patterns, worked in Normandy in green and black silks." Shakespeare mentions it twice — in 'A Midsummer Night's Dream,' when Helena reminds Hermia that they worked together on a sampler, and in 'Titus Andronicus' in reference to the Greek story of Philomela. From the 16th century samplers are constantly met with in records and diaries and even in wills, for they were deemed worthy of special bequest. Samplers of the 16th and 17th centuries often contained insertions of reticella or cutwork (see LACE), drawn-work and patterns for needle-point lace; for although pattern-books of lace were published, they were hard to procure and the supply was limited.

The evolution of the sampler is as follows: First, the sampler consisted of decorative pictures thrown here and there upon the surface of a piece of canvas; then came designs placed in orderly rows and making in themselves a harmonious whole; next, alphabets and numerals chiefly for the use of these who marked the linen; and next, imitation of tapestry pictures by the addition of figures, houses, birds, animals and flowers. Last of all the sampler was adopted as an educational task in a dame's school as a specimen of a pupil's phenomenal achievement at an early age.

The sampler was used in all European countries; and beautiful specimens of Spanish, French, Italian, Dutch and German work exist. To us the English examples are the most interesting because the American samplers are English in character of workmanship and design.

The earliest of all known samplers is in this country. It is owned by the Essex Institute in Salem, Mass., and was worked by Ann Gower, the first wife of Governor Endicott. She came to Salem in 1628 and died in 1629. The sampler was, of course, worked in her girlhood in England. The upper part consists of the alphabet and the lower contains examples of needle-work. Another early sampler, worked by Loara Standish, daughter of Captain Miles Standish, is preserved in Pilgrim Hall, Plymouth, Mass.

The age of a sampler is told by the character of the designs and lettering, coloring, border and insertions. The earliest samplers are long and narrow. A conventional strawberry and oak leaf, or acorn, appears in almost every 17th century sampler. The rose is very frequent, but is not so much used as the "Persian pink," or carnation.

The curious human figures with outstretched arms, known as "Boxers," appear between 1648 and 1742. When they disappear, their place is taken by Adam and Eve in the garden of Eden. During the early part of the 18th century the sampler consisted exclusively of long sentences worked in silks of every imaginable hue. A peculiar mustard-colored linen was introduced as groundwork for the stitches after 1700. Toward the middle of the century blues, greens, yellows and blacks were the prevailing colors for the silks. The stag, which had appeared but rarely before 1700, now became the fashion and continued to be worked as long as samplers were made. About 1728 the border encircled the whole sampler; and it is noticeable that as the variety of patterns decreased the sampler became shorter. From 1740 onward the border always appears and the sampler is a picture instead of a pattern-sheet. Next, the border develops into a wreath of naturalistic flowers. A few dates of decorations will aid the curious in determining the period of any sampler. Alphabets, name of the maker, rows of ornaments, stag (occasionally), and Boxers date from 1648; numerals, 1655; inscriptions, 1662; crown, 1691; motto or text, 1686; verse, 1696; Adam and Eve, 1709; border, 1726; floral border, 1730; fleur-de-lis, 1742; flower in vase, 1742; heart, 1751; stag (commonly used), 1758; house, 1765; mustard-colored canvas, 1728; Spies to Canaan, 1804; crewels replace silk, 1820.

The inscriptions consist of moral sayings, allusions to death and its terrors, hymns, melancholy and lugubrious verses and quotations from the Bible. Sometimes an entire Psalm was worked in letters as clear and neat as those of a printer. The plodding needle also took for its task the Lord's Prayer, or the Ten Commendments. Sometimes, too, the sampler was worked with the names and dates of birth and death of an entire family, proving once again that needlework occasionally fulfilled its ancient purpose of recording events. See EMBROIDERY.

In the 18th century maps were worked on samplers in the dame's schools for the double purpose of teaching geography and needlework. Many of these survive. Darning samplers were made in the 19th century. These show various kinds of darning stitches suitable for mending certain textiles, and are arranged in circles and squares around a basket, or a vase of flowers. Consult Huish, Marcus B., 'Samplers and Tapestry Embroideries' (London 1900); Jourdain, M. A., 'English Secular Embroidery' (London 1910); Earle, Alice Morse, 'Home Life in Colonial Days' (New York 1898), and 'Child Life in Colonial Days' (New York 1899); *Century Magazine* (1912).

SAMPSON, Archibald J., American diplomat and author: b. near Cadiz, Ohio, 21 June 1839. He was graduated from Mount Union College, Ohio, in 1861 and from the Cleveland Law School in 1865; served through the Civil War in the Union army, starting as private and attaining the rank of captain; was admitted to the bar in 1865 and settled in Sedalia, Mo., where he engaged in the practice of law. There he was successively city, county and district attorney. He removed to Colorado in 1873, locating in Canyon City and establishing his law practice. There he was again county attorney and in 1876 was elected attorney-general of the State. In 1889 President Harrison appointed him American consul at Paso del Norte, Mexico. On leaving there he located in Phoenix, Ariz. In 1897 President McKinley appointed him Envoy and Minister of the United States to the republic of Ecuador, where he remained until 1907, being the first person for over 60 years living in a territory to receive a diplomatic appointment. Since his return to the United States he has spent a good part of his time lecturing on "Masonry as seen in Foreign Lands," and other subjects. Mr. Sampson is past department commander, Arizona Department of the G. A. R.

SAMPSON, Deborah, American heroine: b. Plymouth, Mass., 17 Dec. 1760; d. Sharon, Mass., 29 April 1827. She served in the Continental army for three years during the Revolutionary War, disguised as a man and bearing the name of Robert Shurtleff. She gained a reputation for coolness and courage in action and was engaged in many daring enterprises. She was wounded by a sabre cut on the temple in a skirmish near Tarrytown and later was shot through the shoulder. During the Yorktown campaign she was seized with brain fever and her sex was discovered. She was discharged by Washington, receiving from him a note and a purse of money and later was invited to the capital, where Congress voted her a pension and a grant of lands. She published her experiences under the title 'The Female Review' (1797; new ed. with introduction and notes by Rev. John A. Vinton, 1866).

SAMPSON, William Thomas, American naval officer: b. Palmyra, N. Y., 9 Feb. 1840; d. Washington, D. C., 6 May 1902. In 1860 he was graduated from the United States Naval Academy, where he had been the highest officer of the cadet battalion. His first assignment was on board the frigate *Potomac.* He was promoted lieutenant, 16 July 1862 and two years later became executive officer on the ironclad *Patapsco* of the South Atlantic blockading squadron. He held the watch, 15 Jan. 1865, on the turret roof of the *Patapsco* when that vessel was blown up and sunk by a torpedo in Charleston Harbor. Only his own coolness saved his life in that catastrophe. He became lieutenant-commander in 1866 and commander in 1874. In the autumn of the last-named year he was detailed for the third time as instructor at the Naval Academy and remained there four years in charge of the department of physics. Later he became assistant superintendent of the Naval Observatory, and in 1884 was a member of the International Prime-Meridian and Time Conference at Washington. He was superintendent of the torpedo station at Newport, 1885–86; representative to the International Marine Conference at Washington in 1886, and superintendent of the Naval Academy 1886–90, where he introduced great improvement in the state of training. In 1889 he was promoted captain and later put in command of the *San Francisco,* the first steel cruiser of the new navy. During his term as chief of the Bureau of Naval Ordnance, 1893–97, the use of smokeless powder was perfected by experiments conducted under his supervision. Upon quitting this post he was put in charge of the battleship *Iowa,* which had been placed in commission in June 1897, and with this ship he took his place as senior captain in the North Atlantic squadron. On 17 Feb. 1898, two days after the battleship *Maine* was blown up in Havana Harbor, he was appointed president of a board of inquiry directed to investigate the causes of that disaster. On 22 March the investigation was concluded and Captain Sampson, promoted to the rank of acting rear-admiral, succeeded Admiral Sicard in command of the North Atlantic squadron. Upon the declaration of war with Spain, 21 April, he was ordered with his fleet to blockade the northern coast of Cuba. A few days later the Navy Department was informed of a Spanish fleet under Admiral Cervera having sailed from the Cape Verde Islands toward Cuba. Admiral Sampson was forthwith ordered to intercept this fleet in its supposed progress to the relief of Havana. On 1 June he arrived off Santiago, where the Spanish fleet had meantime been located and at once effected a strict blockade. On 3 June, under his orders, an unsuccessful attempt was made by Naval Constructor R. P. Hobson and others to prevent egress of the Spanish fleet by sinking the *Merrimac* in the channel entrance to the harbor. On the morning of 3 July Sampson had withdrawn on the flagship *New York* and was proceeding to Siboney for a conference with General Shafter, the commander of the land forces, when it was discovered that the Spanish ships were leaving the harbor of Santiago. The *New York* was put about and, under full steam, overtook the blockading fleet already giving battle under the direction of Commodore Schley, commander of the flying squadron and second in command of the blockading fleet. The entire Spanish fleet was destroyed and Admiral Cervera was captured. After the close of the war a long and bitter newspaper discussion ensued over the question whether the chief honors of this victory belonged to Sampson or Schley. A court of inquiry which met three years later, at the request of Schley, decided against his claims, but the controversy prevented Congress from awarding any official recognition to Sampson for his success. For two years from October 1899 Admiral Sampson held command of the Boston Navy Yard. In October 1901 he was placed on waiting orders; his health was much impaired; he was retired from active service 9 Feb. 1902, and resided in Washington until his death.

SAMSHUI, China, a treaty port in the province of Kuang-tung, situated on the river West, about 100 miles west of Canton. The town is small, but favorably situated for foreign trade.

SAMSON, one of the judges over Israel. He was of the tribe of Dan, and the circumstances attending his birth, heralded as it was by an angel, his consecration as a Nazarite, and those visitations of the Spirit of the Lord through which he was enabled to perform feats of heroic might, marked him out as a man raised up to meet a national emergency. The first recorded instance of the exercise of his great strength is in connection with his marriage to a daughter of the Philistines. At the wedding-feast Samson proposed a riddle to the guests, wagering 30 shirts and as many suits of clothes that they could not guess it in seven days. The secret of his riddle being betrayed to them by his wife, Samson went to Askalon, killed 30 Philistines and gave their clothes to his guests. His wife having, during his absence in his own country, married again, he caught 300 foxes and tying them together tail to tail, with a fire-brand between them, let them loose in the fields of the Philistines. His own countrymen bound and delivered him into the hands of his enemies, but he snapped the cords asunder and killed 1,000 Philistines with the jaw-bone of an ass. From this period Samson was judge of Israel for 20 years. While on a visit to Gaza the gates of the city were closed upon him by the Philistines, whose intention it was to kill him, but he rose and carried off the gates to a distance of 20 or 30 miles. Not long after he fell in love with Delilah, to whom he revealed the secret of his strength, and she by cutting off his hair deprived him of his powers and betrayed him to his enemies, who put out his eyes and set him to work in a mill with slaves. At a great festival in honor of Dagon Samson was brought out to furnish sport to the Philistines. But his hair had grown again, and his vigor having returned with it, he took vengeance on his enemies by pulling down over their heads the building in which they were assembled. Milton has made his death the subject of a drama — 'Samson Agonistes' (1671), Handel that of an oratorio, 'Samson' (1743) — and his exploits have been illustrated in the woodcuts of Dürer, and the paintings of Guido Reni, Rembrandt and Rubens.

SAMSON AGONISTES, a tragedy in blank verse and irregular meters, the final work of the English poet, John Milton, was published in 1671. In substance the drama is based on the story of Samson in Judges xiii–xvi; in form it follows rigorously the model of classical tragedy.

The action is limited to the final episode of Samson's life, his destruction of himself and great numbers of the Philistines by pulling down the pillars of their theatre, at a public festival to which he had been brought as a captive to entertain the populace. Preparation for the catastrophe is made by a series of events, comprised in a single day, which rouse Samson to make final use, for the glory of the

Hebrew God, of the power which had been entrusted to him and which through his own sin he had temporarily lost. A chorus of Hebrews reviews the events of Samson's life and interprets the changing emotions of the action.

The intensity of feeling which Milton has put into his picture of Samson is due to the analogy which he felt between the lot of his hero, a chosen champion of God, "blind amid enemies," and his own position in the alien society of the Restoration. Though lacking the poetic brilliancy and the variety of 'Paradise Lost,' 'Samson Agonistes,' by virtue of its moral and spiritual energy and its consummate art, makes a profound impression on the reader. More nearly than any other work in our literature it is the modern counterpart of The Book of Job. Consult the works on Milton listed under PARADISE LOST; also 'Samson Agonistes' (edited by Verity, A. W., 1892); and Jebb, R. C., 'Samson Agonistes and the Hellenic Drama.'

JAMES H. HANFORD.

SAMUEL, Hebrew judge and prophet about 1140 B.C., whose rule preceded the establishment of the kingly office. His name, in Hebrew "Shemuel," meaning "asked from," or "heard of God," is explained by his story as a child. He was the son of Elkanah, of Ramathaim-zophim, belonging to the tribe of Levi, by Hannah. Hannah had been barren previous to the birth of Samuel, but she prayed earnestly to the Lord for a man-child, and vowed that if her petition were granted she would consecrate the child to the Lord all his days. Her prayer being heard she took her son to Shiloh to surrender him to the high-priest to be trained to the service of the Lord. The boy grew up devoted to the temple service; but after the death of Eli nothing more is heard of Samuel for a space of about 20 years, while the Ark, restored by the Philistines, was in the house of Aminadab. He then exhorted the Israelites, when they were hard pressed by the Philistines, to abandon their idolatry, and to fear God and worship him, as their only means of deliverance. His prayers and sacrifices gained for them the victory at Mizpeh, and it is probable that from this time, and in consequence of the leading part Samuel then took, he obtained the name and authority of judge. It is recorded that he judged Israel all his life, going a yearly circuit from Ramah, where was his home, to Bethel, Gilgal and Mizpeh. At Ramah he built an altar to the Lord. His administration was distinguished by the restoration of the neglected worship of Jehovah. He also established schools of the prophets. In his old age the corruption of his sons, to whom he had transmitted the active duties of the office of judge, excited discontent among the Hebrews, who demanded a king. Samuel reluctantly yielded to this revolution, but at the same time anointed the king of the general choice. After the establishment of the monarchy Samuel still continued to be judge in matters affecting morals and religion, in addition to the exercise of his prophetic functions. In his bearing toward Saul Samuel conducted himself with wonderful dignity and kindliness. He earnestly desired that Saul, as king, should rule well in the fear of the Lord, and that his dynasty should be permanent. When Saul attacked the priestly office and privileges Samuel anointed a new king, David. He did not live to see the contest between David and Saul decided; but even after his death his spirit, evoked by the witch of Endor, threatened Saul with the divine vengeance. See SAMUEL, BOOKS OF.

SAMUEL, Books of. In the Hebrew Bible the two books of Samuel, like Kings, formed originally one book. The title is derived from the name of the prophet who appears as the principal character in the earlier part of the narrative and who played a most decisive part in the founding of the Hebrew monarchy.

The book seems to have been composed, in essentially its present form, shortly before the publication of the law of Deuteronomy in 621 B.C. After that event Samuel received some editorial revision and additions, but no such rigid framework, designed to teach the great lessons of Deuteronomy, as is seen in Judges and Kings. It thus belongs to the first great era of Hebrew historical writing, which began in the latter half of the 10th century B.C. and ended with the publication of Deuteronomy. The analysis of this book into its component documents has not been so satisfactorily worked out in detail as in the case of the narrative books of the Hexateuch, but there is no great difficulty in recognizing a general distinction between the older and younger elements, at least in the first part of the work. The earlier strand gives a vivid, natural account of the rise of the monarchy, with Samuel appearing as a local seer and leader of a religious-patriotic movement, eager to unite the Hebrew tribes in a struggle against their Philistine oppressors. In the later strand, Samuel figures as himself a recognized military leader and "Judge" of united Israel, who wins overwhelming victory in the struggle against Philistia and is at first opposed to the establishment of the kingship. The earlier picture shows the "king maker" as a really greater and nobler man than the later represents. From a relatively obscure position, with keen vision he recognizes in the unawakened giant who comes to consult him the possibilities of a king who shall unite and free the tribes, and he very skilfully sets in operation influences that make Saul's own action sure. In the later tradition, which took shape in Samuel's own tribe, the figure of the prophet has grown into that of one who holds a position of recognized leadership and authority, but it is no longer one who sees the real need of the time. Many scholars connect the earlier strand with the great Judean history that appears throughout the Hexateuch, and the later with the similar Ephraimite history. It seems more probable, however, that the later strand was written after the composition of the Ephraimite history, while the early stories of Samuel and Saul were composed before the Judean history of the Hexateuch. In the latter part of 1 Samuel and in 2 Samuel we do not have so clearly an inweaving of an earlier and later document, but it is possible to distinguish, to some extent, the younger and older elements. Recognition of the composite origin of the book relieves the obvious difficulty of the duplicate narratives that puzzle any attentive reader — the two introductions of David to Saul, the two origins of the saying concerning Saul among the prophets, the two accounts of sparing Saul's life, etc. The analysis also brings into clear relief as a separate document the wonderful, dramatic story which, with some later elements, constitutes chaps. ix to xx of 2 Samuel.

The book as a whole attained substantially its present form earlier than any other of the historical books of Israel. In its completed form, it falls into five principal sections, due in part to the plan of the compiler and in part to the form in which the materials came to him: (1) Samuel and the establishment of the kingdom under Saul (1 Samuel i–xiv); (2) Saul and the rise of David (1 Samuel xv–xxxi); (3) the establishment of David as king (2 Samuel i–viii); (4) court and family life of David (2 Samuel ix–xx); (5) Appendix (2 Samuel xxi–xxiv). Some would treat (2) and (3) as one section — the summaries of the reigns of Saul and David introduced into 1 Samuel xiv and 2 Samuel viii would favor such division. In the opening chapters of the book the scenes lie in the days of the Judges, when the tribes of Israel are without political union or any common organization. The birth and boyhood of Samuel are recounted. The defeat of Israel by the Philistines with the capture, vicissitudes, and restoration of the Ark precede Samuel's judgeship and victory in battle against the Philistines. The circumstances leading to Saul's selection as king and his early victories are followed by the summary of his wars and a notice of his family. The second section opens with the rejection of Saul and the introduction of David to the history. It is occupied chiefly with Saul's growing jealousy and David's flight and outlaw life. Saul's last battle against the Philistines closes this section. The third division gives David's elegy over Saul and Jonathan, taken from a collection of national songs known as the Book of Jashar. The narrative goes on to record the steps by which David becomes king over all Israel, with the Philistines subdued and the Hebrew capital established at Jerusalem. The summary of David's victories and his court officers closes this section. The following division (2 Samuel ix–xx) tells the story of the birth of Solomon and the troubles in David's family that resulted in the deaths of older brothers, making room for Solomon's ascent to the throne. The conclusion of this dramatic narrative is not given in the book of Samuel, but forms the introduction of the book of Kings. The appendix contains two songs ascribed to David, one of which occurs also as the 18th Psalm, lists of David's heroes, and two very primitive stories of a famine and pestilence that occurred during his reign. Samuel thus contains a history of the transformation of a group of tribes into an organized state, commanding the respect of neighboring kingdoms and able to weather the storms of rebellion and civil war.

Viewing the book as literature, the early narrative of Saul's selection, beginning with chap. ix, the stories of his jealous struggle against the rising prestige of David, and the complex story of David's court and family life are to be noted as the earliest examples of connected prose in ancient Israel. As such they constitute the beginnings of genuine historical literature in the writings of the world. From these vivid narratives, committed to writing soon after the events had occurred, the writers of Judah and Israel later went on to compose the story of the earlier past. In power to select the significant points that make character and event living and intelligible, these early narratives are unexcelled in prose literature. The religious and moral conditions recorded show many primitive traits, yet the narratives are characterized by a devotion to the God of justice, who cares for right conduct among men, that makes them perennial sources of moral and religious inspiration.

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SAMURAI, the feudal warriors of Japan, who, prior to the revolution of 1867–68, comprised about one sixteenth of the population (see JAPAN) and are now represented by the *shizoku,* or knights. They were distinguished by indomitable courage, their marvelous feats of arms, fervent patriotism, intense loyalty and a strong antipathy to foreigners, which was in marked contrast to the hospitable and courteous demeanor of the mass of the population. They were the military retainers of some 276 daimios or feudal chieftains, the more powerful among whom were those of the southern clans Satsuma, Choshiu, Tosa and Hizen. After the reopening of foreign relations due to United States initiative in 1854, the enlightened Japanese discovered at once that to place themselves commercially and politically on a level with the progressive nations of the world they had to adopt Occidental methods and the prominent chiefs and their samurai were the first to advocate the suppression of the Tokugawa shogun, the supremacy of the mikado, the surrender of feudal powers, and a reorganized administration for the building up of a constitutional monarchy, most of which was effected by the revolution of 1868.

The samurai expected that the military and naval services would be exclusively reserved for them and their descendants. The radical measures adopted in 1871, however, led to the total abolition of feudalism and the absorption of the samurai into the mass of the people, in many cases with a praiseworthy self-abnegation, but in others not without serious opposition. That of the famous Saigo of Satsuma, hitherto one of the most prominent reformers, culminated in the civil war of 1877 and the total defeat of the samurai and their pretensions. See JAPAN.

SAMVAT, a method of reckoning time in India, generally used except in Bengal. Chris-

tian dates are reduced to Samvat by adding 57 to the Christian year. See CALENDAR.

SAN ANDRES, săn ăn'drās, or **PICO DE ORIZABA,** Mexico, an extinct volcano, called by the Aztecs Citlalepetl, or Mountain of the Stars, 6½ miles southeast of the city of Orizaba. It is 5,550 metres high and the loftiest mountain of Central America. Its highest pass, Cuchilla, has an elevation of 4,418 metres, snowline of 4,292 metres; the deepest glacier, El Corte, 4,015 metres. It was first ascended in 1848, by two American officers, Reynolds and Maynard. Its last eruption extended from 1545–66.

SAN ANGELO, ăn'jĕl-ō, Texas, town, county-seat of Tom Green County, on the Concho River and on the Gulf, Colorado and Santa Fé Railroad, 180 miles northwest of Austin. It is the centre of a prosperous stock-raising and wool-growing region; agriculture is also carried on successfully in the vicinity; fruit and celery being important products. The town contains flour mills and an ice factory. In 1918 there were four national banks with combined capital of $625,000 and resources of $4,670,410 and the assessed property valuation exceeded $6,000,000. It has an elevation above sea-level of 2,000 feet and is a health resort, especially for consumptives. There is a public high school established in 1889. Pop. 9,392.

SAN ANTONIO, Texas, city, county-seat of Bexar County and the largest city in the State, is on the San Antonio River, 150 miles from the Gulf Coast and about the same distance from the Rio Grande border at Laredo. This quaint and picturesque old city of Spanish origin is beautifully laid out on a plateau 661 feet above the sea-level, along both banks of the San Antonio, a few miles from where it bursts forth — at once a river of volume and great natural beauty — from hundreds of crystal springs, in a noble woodland park. Through the western part of the city runs a smaller stream flowing out of another group of sparkling waters, situated in a live-oak grove, known as San Pedro Springs.

Railroads.— The Southern Pacific, International and Great Northern, Missouri, Kansas and Texas, San Antonio and Aransas Pass and San Antonio and Gulf railroads pass through the city and the extension of the Frisco main line makes it a great railroad centre, from which four distinct lines penetrate into Mexico.

Waterworks and Sewer System.— The San Antonio Water Works Company, a private corporation, maintains a thoroughly modern system of water supply. The water is obtained from 17 large artesian wells, furnishing a daily supply of 50,000,000 gallons of wholesome water. The company also owns riparian rights around the head springs of the San Antonio River and has a large reservoir adjacent on a hill, kept fully supplied for any emergency. In addition many of the office buildings, hotels and manufacturing plants have their own wells yielding an additional 45,000,000 gallons daily. The sewer system, constructed after the most approved engineering science, meets the latest sanitary requirements.

Street Railway and Lighting.— The traction company has 96 miles of well-built electric lines furnishing modern equipment and excellent service to an annual average of 32,000,000 passengers carried. There is also maintained a complete plant for gas and electric lighting and power, with all the necessary mains and supply lines.

Parks and Plazas.— There are 26 cultivated parks and plazas in the city comprising 423 acres and valued at more than $2,000,000 under the management of a park commissioner. The city is renowned for the beauty of its natural parks and the attractive features of its old Spanish plazas. Brackenridge Park, situated adjacent to the head springs of the San Antonio River, is a noble forest of 230 acres, left in its natural state of oak, pecan and shrub growth and containing miles of well-kept walks and drives. In this park there is maintained a rare collection of buffalo, deer, antelope, elk and other wild animals. Through it flows the San Antonio River which furnishes the site of the Lambert Bathing Beach, one of the most popular resorts of its kind in the country. San Pedro Springs is another favorite resort, with lakes, shady groves and an excellent «zoo.» Seventeen iron bridges span the serpentine windings of the river in its 13 miles' course through the city, giving picturesque views at many points.

Many of the quaint characteristics of the old Spanish *régime* are still to be found in the public plazas, fragrant with their tropical trees and plants and famous for their Mexican chile and tamale stands and in the narrow streets in the old parts of the city, still called by their liquid Spanish names. The San Antonio Club, country fishing and hunting associations, golf links and tennis grounds afford recreation for the society world; the military reviews and artillery drills of the large garrison at Fort Sam Houston and during the late war Camp Travis, Camp Stanley, Kelly Aviation Fields and Balloon School draw crowds of visitors; and the annual spring carnival and battle of flowers on San Jacinto day have made San Antonio as noted as the Mardi-Gras spectacles have New Orleans.

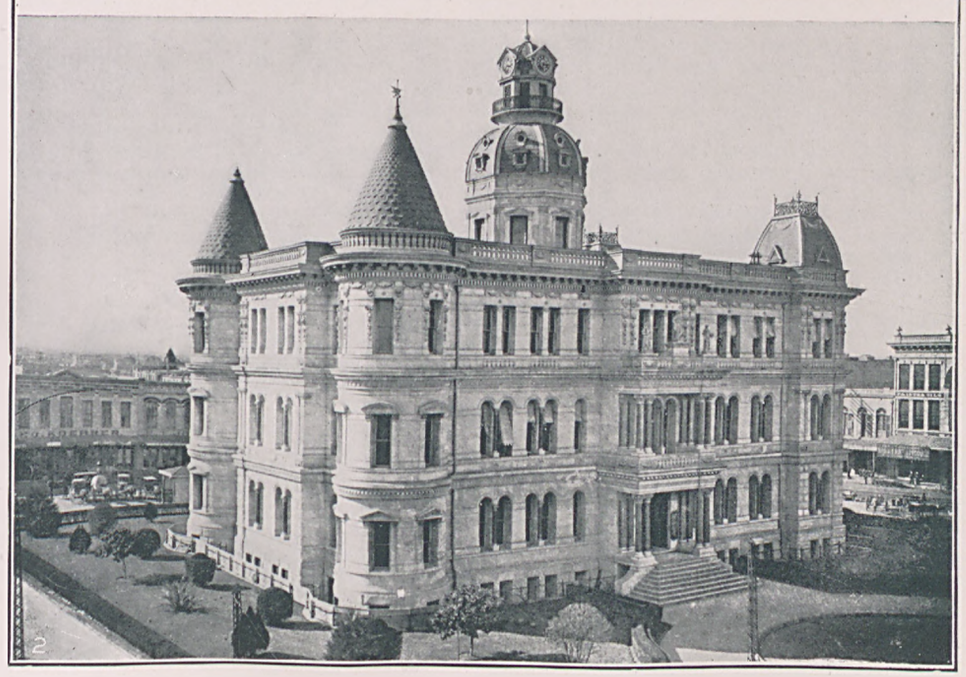
Public Buildings.— Among the public buildings are the courthouse, the Federal building, the market house and convention hall, with a seating capacity of 4,000; the city hall, the Grand opera house, the San Fernando cathedral, part of which was built in 1749; the Saint Mark's Cathedral, the city and county hospital, the many fine hotels, whose open courts are filled with tropical plants, palms and flowers; several theatres and numerous stately and ornamental business blocks.

Commerce, Banking and Manufactures.— The unique situation of San Antonio, 200 miles from any rival business centre, has given it a commanding position as to the trade of a large section of Texas and Mexico. Large wholesale houses push their business through an extensive territory. The city possesses about 269 manufacturing establishments, including several machine shops and foundries, flouring mills, binderies, cotton presses, cement works, broom factories, oil mills, etc., and their products are distributed through a vast section. There are 24 banks: National, State and private. Their combined capital is more than $8,000,000; their deposits average about $40,000,-

SAN ANTONIO, TEXAS



1 Court House and Main Plaza



2 City Hall — Military Plaza

000; their cash on hand averages about $16,000,000 and their loans over $36,000,000. The manufacturing establishments employ 7,000 people, are capitalized at $18,000,000 and produce merchandise to the value of $30,712,876. The city is a prominent cotton market and is the financial centre of the most extensive stock interests in the Southwest. San Antonio is surrounded by many acres of irrigable farms, with water supplied by numerous artesian wells obtained at an average depth of about 1,200 feet. Truck gardening is here conducted on an extensive scale, largely by Belgian gardeners, and the products are shipped to the northern markets, where they are months ahead of similar products from other sections.

Churches and Education.— San Antonio has two beautiful cathedrals and 79 churches of the leading denominations. The public schools are under the control of a school board elected by the people. There are 34 public elementary and three high school buildings, valued at $3,000,000. The total annual enrolment of pupils is 25,000. There are also located in the city and its suburbs 36 private schools and colleges, making it one of the most important educational centres in the South. These private institutions contain several thousand pupils. The Carnegie Library, established through the liberality of Andrew Carnegie, occupies a building constructed at an expense of $50,000 on a site valued at $15,000. It is under the control of a board of trustees; has endowment funds of $10,000 invested, the income of which, together with a special tax of some $5,700 annually levied under a special provision of the city charter, maintains its work.

Government.— The administration of municipal affairs is under the commission form of government. The mayor is the chief executive officer, assisted by four commissioners. An excellent paid fire department and a thoroughly efficient uniformed police force are maintained. The assessed valuation of property in the city for taxable purposes is $130,368,660. The total tax rate for city and school purposes, $2.15. The Somers system of realty equalization became operative 1 June 1914. Under the State organization there are held in San Antonio three district courts, one of them with criminal jurisdiction, a court of civil appeals of three judges, a county court with probate jurisdiction and two justices of the peace courts, and under the Federal Jurisdiction District and Circuit courts.

Suburban Attractions.— There are several attractive suburban additions, not strictly included within the city limits, such as West End, Alamo Heights and the Hot Sulphur Wells. These are all noted for their handsome improvements and beautiful surroundings. The Sulphur Wells Company has an elaborate bathing pavilion where medicinal, Turkish and vapor baths are given, with all the usual massage accompaniments, and a modern, well-conducted hotel for its patrons. There are also in close proximity to the city other medicinal, hot sulphur and chalybeate artesian wells, notably the Terrell and Dullnig properties, whose remarkable curative qualities are well established. Corpus Christi, Rockport and Aransas Pass for sea fishing and duck hunting, Lake Medina and Mitchell Lake, Laredo, where excursions may be made into old Mexico, are all within easy access.

Climate.—The altitude of the city is 661 feet above the sea-level at the main plaza; at Fort Sam Houston on the government hill it is 768 feet. The average annual temperature is 68°; mean maximum in summer, 79°; mean minimum in winter, 57°. The air is dry, bracing and aseptic, the average relative humidity being 67°. The summer heat is tempered by a strong current of air which blows for nearly eight months almost constantly from the Gulf, making the summer nights delightful. The winter climate most of the time resembles, in its salubrity and temperature, that of Cairo, Sorrento, or the Riviera, varied at times by a norther, which stimulates like a tonic. The attractions of the climate, the wealth, refinement and hospitality of its cosmopolitan people, its quaint and artistic beauty and its interesting historical associations and landwarks make San Antonio one of the most charming, picturesque and notable cities in the Union.

History.— The first Spanish settlement at San Antonio grew out of the fierce rivalry between Spain and France for the possession of Texas. There were probably temporary military encampments made on the site of the present city by the exploring expeditions of Alonzo de Leon and Domingo Teran, in the latter part of the 17th century; but the real beginning of the city dates from 1716, when the presidio (garrison) of San Antonio de Bejar (or Bexar, pronounced Báy-har) was established on the San Pedro Creek, within the present city limits, by Don Domingo Ramon.

Two years later followed the Franciscan mission of San Antonio de Valero, and in 1722 both the presidio and mission are found firmly settled on the Plaza de las Armas, now the military plaza of the modern city. In 1730, under a royal decree issued with a view of colonizing the new military and religious settlement, 15 families were brought from the Canary Islands, the head of each raised to the dignity of a hidalgo, and all located adjacent to the presidio, where, around what was then called the Plaza de las Yslas and now constitutes the main plaza, they proceeded to establish the pueblo (or villa) of San Fernando de Bejar. The mission of San Antonio de Valero was afterward, in 1744, removed half a mile farther east to the site still occupied by the historic chapel of that mission, known as the Alamo, and forever hallowed as the scene of the desperate and tragic struggle of 6 March 1836. From these various names of the presidio, mission and pueblo, respectively, there has been evolved by some gradual blending process the modern name of San Antonio de Bexar, the affixed name having, under the State organization, been finally given to the county.

While Texas was a Spanish and Mexican province, San Antonio, called indiscriminately in those days San Antonio and Bejar, was most of the time the capital and always an important military station. During the long war of the revolution of Mexico against Spain, the old city witnessed many scenes of fierce strife and cruel bloodshed. Revolutionists and royalists engaged in bitter contests for the possession of the city, amidst scenes of unparalleled atrocity. In 1811 the head of Nicolas Delgado, a prominent adherent of the revolutionary party, was stuck upon a pole on the main street, after his cruel execution by order of the Spanish governor, Salcedo. On 29 March 1813, the battle of the Rosillo was fought a few miles from the city,

in which the royalist army, under Governor Salcedo, was defeated, with the loss of 1,000 men, by Mexican revolutionists and American adventurers under Gutierrez and Kemper. San Antonio at once fell, and a junta of revolutionary chiefs ordered butchered immediately in cold blood, in revenge for the execution of Delgado, the governor, Manuel de Salcedo, Governor Herrera of New Leon and 15 other Spanish officers who had surrendered. On 4 June 1813, General Elisondo with a royalist force of 1,500 was defeated on the heights of the Alazan, one mile west of the city, after a desperate battle, by the revolutionists and Americans under Gutierrez and Colonel Perry.

The famous Spanish general, the Marquis of Arredondo, now marched on San Antonio with a new army of 2,000 men, and 18 Aug. 1813, met the Republican forces commanded by Toledo and Perry, near San Antonio, on the Medina, and, after a furious contest, defeated them amidst frightful carnage. Arredondo immediately entered the city with his triumphant army, and proceeded to make the most cruel exactions and bloody reprisals upon the patriot population. Private property was confiscated; 600 citizens were crowded into narrow and unwholesome prisons, where many died through suffocation; others were at once shot, including all the male members of the Delgado family, not sparing even a boy of nine years; hundreds of women of the best families were imprisoned in the Quinta and compelled to grind corn for Arredondo's army. These bitter contests and periodical revolutions nearly ruined the city; and it was not until the independence of Mexico was finally won in 1821 that its prosperity began to revive. By 1823 its population had increased to nearly 5,000.

In 1835 the revolution of Texas against the dictatorial government of Santa Anna (pronounced Sant' Anna) broke out. A Texan force of 800 men under Burleson and Milam advanced upon the city, then under the command of General Cos, with an army of 1,400 men, and, after a siege of a month, the city was gallantly stormed by the Texans, losing in the assault their courageous leader, Ben Milam. On 10 Dec. 1835 Cos surrendered his entire command, with 21 pieces of artillery, and large stores of ammunition and supplies. During the succeeding winter the city was held by a small force of Texans under the command of Wm. Barret Travis, assisted by such heroic spirits as the renowned frontiersman, Davy Crockett of Tennessee, James Bowie, who had lived several years in San Antonio and had married there Governor Veramendi's daughter, and the chivalrous Colonel Bonham of South Carolina. The dictator, Santa Anna, in February 1836, completed his vast preparations for retaking San Antonio and marched from Monclova with a force of nearly 6,000 men, the *élite* of the Mexican army. Learning of his near approach, Travis, with 145 men, subsequently increased by volunteers to a total of 179 men, retired from the presidio on the military plaza and established his little command in the abandoned mission-fortress of the Alamo. Santa Anna took possession of Bejar 23 Feb. 1836, and rapidly completed the investment of the Alamo, surrounding the mission on all sides. He had three brigades of infantry under Generals Sesma, Tolsa and Gaona, a cavalry command under Andrade, and ample siege artillery directed by General Ampudia. The hardy Texans had not only their deadly rifles to depend upon, but also 14 pieces of artillery which had been mounted by their Mexican predecessors on the church itself and on the walls surrounding the rectangular court of the mission. These walls have long since disappeared, but the site of this court is the northern part of the present Alamo plaza. Here, then, for 10 days, took place the most memorable, thrilling, tragic and sanguinary siege in American history; 179 indomitable American frontier riflemen against an army of 6,000 brave and disciplined troops, led by veteran officers. After many desperate assaults and bloody repulses, on 6 March 1836, four storming columns of 2,500 picked troops, led by Cos, Duque, Romero and Morales, amidst death-dealing volleys and horrible carnage from the murderous rifles and artillery of the Texans, finally succeeded in scaling the walls. The heroic defenders fought desperately hand to hand, from wall to courtyard and courtyard to buildings, until the last man perished, there being no survivors of the dreadful massacre but two women, two children and two servants. Santa Anna's total losses in this desperate siege were estimated by Alcalde Ruiz, who superintended the burial of the dead, at 1,600, of which over 600 were killed or died of wounds.

It was on this sacred spot, thus baptized by the blood of heroes, that San Antonio elected to receive President McKinley on the occasion of his visit in 1901, and there to tender the Chief Magistrate of the country the enthusiastic welcome of its people. In 1840, 65 Comanche Indians came into the city to enter into negotiations with Texas commissioners for a treaty of peace. A row broke out in the council house over the surrender of white prisoners; fierce fighting began in the building and continued into the plaza and streets until 32 Indian warriors were killed and all the rest of the party captured. Seven Texans were killed and eight wounded in this bloody contest. In the fall of 1840, 18 dead bodies were brought in from the edge of town and laid out in the courthouse. Nineteen young men had gone out riding for pleasure and had been surprised by a sudden attack of Indians and all had been killed but one, and their bodies left stripped and horribly mutilated.

Mexico still kept up hostilities against the new republic, and 11 Sept. 1842 a Mexican army of 1,300 men under General Adrian Woll surprised the city and captured it, making prisoners of 52 of the most prominent citizens, including the venerable judge of the District Court and the entire bar of lawyers. They were driven on foot in front of mounted guards, a cruel and toilsome march of over 1,000 miles, and imprisoned at hard labor, chained together in couples, for nearly two years in the castle of Perote, in the state of Vera Cruz. Woll, who had remained in San Antonio with his main army, was badly defeated a few days later by Colonels Hays and Caldwell and 220 Texans, in a desperate battle on the banks of the Salado, five miles east of the city, and was obliged to beat a hasty retreat into Mexico.

Military Post.— From the close of the Mexican War to the present time — save during the Civil War — San Antonio has been a military station for troops and generally also the headquarters of the army in Texas. The present military post of Fort Sam Houston and headquarters department of Texas, located on a commanding site in the northeast part of the city, occupying some 640 acres, is one of the largest in the United States, and its construction has cost upward of $5,500,000. It has normally in garrison from 3,000 to 5,000 soldiers. A United States arsenal for storage of ordnance supplies and the manufacturing and repairing of equipment is situated in the southwestern part of the city. Also part of the military establishment are: Camp Travis, one of the national army cantonments, covering 4,000 acres, erected to meet war needs at a cost of $6,000,000, which had in garrison normally about 50,000 troops; Camp Stanley, a great training and manœuvre field of 33,000 acres with a permanent encampment of 5,000 men; the Aeronautical Training School and the great Kelly Fields where 20,000 aviators were training in 1918.

Population.— The city has shown a marvelous development since the Civil War. Its growth has been as follows: (1870) 12,266; (1880) 20,255; (1890) 37,673; (1900) 53,321; (1910) 96,614. The United States census (1920) gives a population of 161,379. The winter population including tourists reaches 235,600.

Bibliography.— Corner, W., 'San Antonio de Bexar' (San Antonio 1890); Bancroft's account of the Storming of Alamo and other references to San Antonio; 'Fall of Alamo' (pamphlet); 'Memoir of Mary A. Maverick,' one of the first white women to live in San Antonio; Spanish documents and reports in Bexar archives, touching Arredondo's victory and operations and various points in early history.

SAN ANTONIO, a river in Texas, which has its rise in Bexar County, formed by the confluence of the Medina River and Leon Creek. It flows east through three counties, a distance of about 200 miles and enters Espiritu Santo Bay, an inlet of the Gulf of Mexico.

SAN BERNARDINO, săn bĕr-när-dē'nō, Cal., city, county-seat of San Bernardino County, on the Southern Pacific and the Santa Fé railroads, about 70 miles from the Pacific Coast, where the transcontinental railroads break through the mountains. Many electric lines connect the city. It was settled in 1851 by Mormons; was incorporated as a town in 1868 and chartered as a city in 1886. It is west of Mount San Bernardino, in a rich agricultural and mining region, where fruit grows in abundance. The chief industrial establishments are the Santa Fé railroad shops, lumber mills, grain elevators and factories in which are made crates for the shipment of fruit. There are about 1,400 men working in the railroad shops and on the trains. In 1914 there were 54 industrial plants, employing a combined capital of $1,392,209, and yielding products valued at $2,612,669. The city makes extensive shipments of fruit, grain and lumber. San Bernardino is a famous health resort both summer and winter, on account of the equable climate, the beautiful scenery and the variety and abundance of fruit. The principal public buildings are the courthouse, the hall of records, the hotels, the seven churches, the Southern California State Hospital for Insane and an orphan asylum. In 1918 there were three national banks with combined capital of $300,000 and resources of $3,409,112. The educational institutions are Saint Bernardine of Sienna Academy, a high school, public and parish schools and a private business college. The government is vested in a board of trustees elected every four years. Pop. (1920) 18,721.

SAN BERNARDINO, (1) a range of mountains in the southwestern part of California; an extension of the Coast Range. (2) A mountain peak of the San Bernardino Range; the highest mountain of the Coast Range and the peak which has given name to the group of mountains to which it belongs. The height is 11,604 feet.

SAN BERNARDINO, a strait of the Philippines between the extreme southeastern point of Luzon and northwestern Samar, connecting the Pacific Ocean with the Visayan Sea. It is of commercial importance as forming the eastern end of the Verde Passage between the United States and Manila.

SAN BLAS, blăs, Mex., in the territory of Tepic, situated on the Pacific Coast southeast of the mouth of the Rio Grande de Santiago. It is the terminus of the Mexico-Guadalajara Railway, and an important port. The industries are ship-building, lumbering and agriculture. In the vicinity are considerable gold, silver, copper and lead mining interests. Pop. 3,500.

SAN CARLOS, kär'lōs, Chile, town in the province of Nuble, in the northern part of the state, on the main railway of Chile, 15 miles northeast of Chillan. Pop. 9,300.

SAN CARLOS, Philippines, pueblo, province of Pangasinán, Luzon, on a tributary of the Agno River, 10 miles southeast of Lingayén. It is the centre of four main highways and near the Manila and Dagupan Railroad. Pop. 27,166.

SAN CARLOS, Order of. See ORDERS, ROYAL.

SAN CRISTOBAL DE LOS LLANOS, krēs-tō'băl dė lōs lă'nōs, or **CIUDAD DE LAS CASAS** (City of Las Casas), Mexico, largest city of the state of Chiapas, lies northeast of the capital, Tuxtla-Gutierrez. It occupies a high (1,981 metres), fertile and beautiful valley on the eastern slope of the central mountain range. It is the see of an archbishop and has a cathedral, several convents, seminario conciliar, or university, a grammar school and a hospital, and a handsome capitol. It has an active trade, especially in coffee; it also has manufactures of earthenware and coarse textiles. The chief occupation, however, is the raising of cattle, horses, mules and swine. The town was founded in 1528 on the site of the ancient Zacatlan, and named in honor of the celebrated priest Las Casas. Pop. 18,700

SAN DIEGO, de-ăgō, Cal., city, port of entry and county-seat of San Diego County, on San Diego Bay, and on the Atchison, Topeka and Santa Fé and the San Diego and Arizona railroads, about 125 miles south of Los Angeles. San Diego Bay, landlocked and safe at all seasons, has an area of 22 square miles, with 39 feet water, low water, over bar. It is one

of the world's 10 great harbors. The city spent $1,400,000 recently for a municipal pier. In 1915 the Panama-California Exposition was held here, and in 1916 the Panama-California International Exposition. The climate is remarkable, equable and salubrious; the average varies but 8° between summer and winter, and but 2° from day to day. The community produces a large amount of fruit, honey, poultry, grain and cattle. There are 200 manufacturing concerns established, the largest being the Hercules Powder Company (potash plant), Swift and Company (potash), Savage Tire Company, Magnesite company, fish canneries, etc. The principal buildings are the Federal building, library, State normal school, high school and stadium, Spreckels building, Union building, Watts building and the American National Bank building. The school system has no superior, considering the population of the city. There are also a number of private schools of splendid merit. San Diego has many fine church edifices; a number of theatres, one costing $1,000,000; hotels and apartments, one hotel costing $1,500,000, another $2,000,000. The bay was discovered in 1542, the San Diego Mission founded by Father Serra in 1769 and the city laid out in 1867. The principal points of interest are Balboa Park, Mission Cliff Gardens, Old Town, Point Loma (one of the three greatest views of the world), La Jolla Caves, Sunset Cliffs, Coronado Hotel and beach, Fort Rosecrans and a wireless station. Pop. 74,683. Consult Gunn, 'San Diego: Climate, Productions, Resources, Topography' (San Diego 1887); Smythe, W. E., 'History of San Diego' (ib. 1907).

SAN DOMINGO, săn dō-mĕng'gō. See SANTO DOMINGO.

SAN DOMINGO INDIANS, a Pueblo tribe of New Mexico. See QUERES.

SAN FELIPE, fā-lē'pā, Chile, an agricultural town and capital of the province of Aconcagua, 40 miles north of Valparaiso, with which it has railway connection, in the fertile valley of Aconcagua. It is an interesting regularly built town, with an attractive central square and highly improved boulevards. Pop. 13,000.

SAN FELIPE INDIANS, a Pueblo tribe of New Mexico. See QUERES.

SAN FERNANDO, fĕr-năn'dō, Chile, town, capital of the province of Colchagua, and a railway junction, 80 miles south of Santiago. Pop. about 8,500.

SAN FERNANDO, Philippines, (1) Pueblo, province of Cebú, on the east coast, 16 miles southwest of Cebú, the provincial capital; pop. 18,200. (2) Pueblo, province of Pampanga, Luzon, on the Manila and Dagupan Railroad, five miles northeast of Bacolor. It is the railroad shipping point for Bacolor, with which it is connected by highway, and is an important centre of the sugar industry, containing sugar mills and warehouses. It also has an extensive wholesale and retail trade in groceries and drugs; pop. 13,270. (3) Pueblo, capital of the province of Unión, Luzon, on San Fernando Bay, 45 miles north of Dagupan. It is on the coast highway and also on the projected route for the continuation of the Manila and Dagupan Railroad. It has also frequent communication with Manila by sea. Fishing is an important industry; pop. 13,270. There are three smaller pueblos of the same name: (*a*) pueblo, province Ambos Camarines, Luzon, a road centre with good trade; pop. 3,270; (*b*) pueblo, Ticao Island, province of Masbate, also known as Butúan; pop. 2,367; (*c*) pueblo, province of Zambales, Luzon, on Bancal Valley highway; pop. 453.

SAN FERNANDO, Spain, on the Isla de Leon, seven miles southeast of Cadiz, in the province of Cadiz, is a fortified town built in modern style. It has two churches, two hospitals, a naval academy and workshops, an extensive arsenal, a fine observatory (the southernmost of Europe) and an iron foundry. It has numerous domestic industries and a brisk trade in salt. Pop. about 30,000.

SAN FRANCISCO, săn frăn-sĭs'kō, Cal., metropolis of the Pacific Coast and one of the largest cities in the United States west of the Mississippi, ranking 12th in the whole country and second only to New York in commercial importance, is situated on a hilly peninsula 40 miles long between the Bay of San Francisco and the Pacific Ocean, in 37° 47′ 22″ N. lat. and 122° 25′ 40.76″ W. long. San Francisco Bay, the only commodious harbor on the Pacific Coast south of Puget Sound or north of San Diego Bay, is entered through Golden Gate Strait, about three miles long and nowhere less than a mile in width, north of the city. The bay is about 90 miles long (50 miles in medial line) and from 5 to 15 miles wide. It has an area of 450 square miles and a shore line of over 300 miles. It is completely sheltered from the sea gales by the low hills of the peninsula and forms the biggest land-locked harbor in the world, affording excellent anchorage ground regardless of tides. It is supplied with drydocks and every facility for the care of vessels. The city is connected with regular lines of steamships: (1) with all ports on the Pacific Coast of North and South America, the distances in nautical miles to the principal points in the north being Portland, Ore., 653; Seattle, Wash., 804; Vancouver, British Columbia, 833; Juneau, Alaska, 1,608; Sitka, Alaska, 1,784; the distances to the principal ports to the south being San Pedro, port for Los Angeles, 393; San Diego, Cal., 482; Mazatlan, Mexico, 1,478; Acapulco, 1,836; Guaymas, 1,954; Panama, 3,277; Valparaiso, 5,140; (2) with the Atlantic seaports via the Panama Canal, the distances being to New York, 5,262; Liverpool, 7,836; (3) with Hawaii, Japan, China, Siberia, the Philippines, distances being Hawaii, 2,100; Honolulu, 2,100; Yokohama, 4,545; Shanghai, 5,387; Hongkong, 6,049; Vladivostock, 4,570; Manila, 6,221; (4) with Samoa, New Zealand and Australia, the distances being Apia, 4,200; Auckland, 5,930; Sydney, 7,210. The city is also connected by rail with all points north and south on the Pacific Coast and all points in the Middle West and east of the United States, the distances being by shortest mail route: to Seattle, 808 miles; to Los Angeles, 482 miles; New Orleans, 2,490 miles; to Chicago, 2,357 miles; to New York, 3,269 miles. Nearly in front of the city are three important islands, Alcatraz (fortified), Angel Island (fortified) and Yerba Buena or Goat Island.



U. S. Grant Hotel and Office Buildings in the centre of business district, with the famous palm-bordered plaza

General Description.— The city, which was originally built on the shore of the bay and on the steep hills rising from it, has gradually extended across the peninsula (here six miles wide) to the ocean. On the north it is bounded by the Golden Gate. The city of San Francisco includes within its municipal territory 46½ square miles, covering a tract of land which is almost square in shape, about seven miles long and seven wide. Many of the streets, especially in the northern and western sections of the city, are very steep, which would have presented an insurmountable obstacle to ordinary street railway traffic, but this problem was simply solved by the cable car system, invented by A. S. Hallidie, whereby the cars are drawn along the tracks by an underground wire cable. Only 25 years ago the western section of the peninsula was an arid waste of shifting sand dunes, continually being augmented by the sands being blown up from the sea beach by the strong sea breezes, but this district has since been entirely built over and the well-paved streets now stretch from the shores of the bay over to the sea shore. In the early days there was a deep dent in the inner, or bay shore of the peninsula. This was filled in and is now the heart of the wholesale business section of the city. The site of the recent Panama-Pacific Exposition was, only a few years ago, a salt meadow marsh which has also been filled in.

The streets are unusually broad and are well paved. The main thoroughfare is Market street, 120 feet wide, which cuts the city diagonally from the water front in a southwesterly direction. The district south of Market street is flat and constitutes the manufacturing section and the homes of the wage-earning classes. But farther to the westward and southward lies the old Mission District, largely a better-class residential section. To the north of Market street lie the steep thoroughfares along which are built the big office buildings and the shops of the better sort and, farther west, the homes of the more prosperous classes and the wealthy capitalists. In the lower part of this section near the water front and within the business district is Chinatown, which has always been one of the picturesque features of the city. Slightly north of Chinatown rise the bald bluffs of Telegraph Hill, whose signal station announced the approach of incoming ships in the early days. Below Telegraph Hill lies the Latin Quarter, where live the few surviving families of the old Spanish population.

Parks.— In 1918 San Francisco had 32 public parks and squares, covering 1,399 acres, or nearly one-twentieth the total area. The chief public park is Golden Gate Park, comprising 1,013 acres of rolling and hilly land reclaimed from the sand dunes. Of about the same shape as Central Park in New York City, it begins almost in the centre of the city and stretches westward over to the shore of the Pacific. Besides its vast lawns and well-graded driveways and boulevards, it includes among its features nine baseball diamonds, a dozen tennis courts, a well-equipped children's playground, a zoological park, a Japanese tea garden, a chain of lakes, an aviary, a botanical garden richly stocked with tropical plants and a 30-acre stadium. Within the past few years the city has spent much money on extending its system of boulevards and driveways, the most notable of these later improvements being the great driveway running along the ocean beach for three miles. At the upper end of this driveway, just below the mouth of Golden Gate Strait, is the famous Cliff House, built on the brow of a cliff overlooking a number of rocky islands out beyond the surf line, on which hundreds of sea lions bask and romp in the sun. Just below the Cliff House and also on the beach is the bathing establishment, one of the biggest in the world, known as Sutro Baths, to whose concrete tanks the water is admitted directly from the ocean. The baths are 250 feet wide and 500 feet long and hold 1,805,000 gallons of water. The Presidio, farther back and on the shore of the strait, is another public park reservation, embracing 1,500 acres, including the barracks and parade grounds of the troops of the Department of California. A magnificent new boulevard extends to the summit of Twin Peaks, where a splendid view of the city can be had.

Climate.— The climate of San Francisco is very equable, a snowfall being so rare as to cause considerable excitement among the people, while frost may appear for only a few nights during the winter. The lowest temperature on record was 29 degrees, while the average temperature for the summer months is 70 degrees, though occasionally it rises to 100 degrees. The mean annual temperature is about 55 degrees. Rain falls only in the winter months, the average rainfall being about 28 inches. During the summer months the southwest trade winds prevail, forming a rather unpleasant feature in that in the afternoons they often attain an almost violent force and sweep the streets with stinging clouds of dust and sand. Fogs, too, are very frequent, especially in the mornings, sweeping in from the sea. In regard to these two disagreeable features the climate of San Francisco differs markedly from the climate of the suburban towns across the bay, Oakland, Alameda and Berkeley, whence large numbers of business men and the more prosperous class of wage-earners commute daily into the city.

Municipal Government and Public Service.— San Francisco has a combined city and county government, based on a charter which went into effect 1 Jan. 1900. Legislative power is vested in the board of supervisors whose 18 members are elected at large. The mayor is elected for a four-year term and he has the power to veto any item in the budget, a five-sixths vote of the board of supervisors being required to override his veto. He appoints the three members of the board of public works, the four police commissioners, the three civil service commissioners, the five members of the board of health, the four members of the board of education, the four fire commissioners, the five election commissioners and the five park commissioners and, within certain limitations, he may remove his own appointees. Appointments to the public service are made under strict civil service rules. The auditor, treasurer, assessor, tax collector, coroner, recorder and the county clerk are elected by the people. The waterworks and the gas and electric lighting systems are in the hands of private corporations, but part of the street railways are owned by the city, San Francisco being the first large

city in the United States to establish a system of municipal street railways. The Twin Peaks Tunnel, a subway system built by the municipality, will accommodate 100,000 passengers daily and contains a double-track railway 12,000 feet long. A municipally-owned waterworks is also contemplated for the near future. Under an Act of Congress, approved 13 Dec. 1913, the city was granted the rights to a watershed of 420,000 acres in the Yosemite Valley, the famous Hetch Hetchey grant. In 1919 the city had already spent nearly $10,000,000 on this work. It is planned to secure a flow of 400,000,000 gallons of water a day. Before the great fire, in 1906, San Francisco had practically no debt, but by 1 Jan. 1919 the net bonded debt amounted to $44,476,100. There are 97 public schools and an enrolment of 70,800 pupils. There are also two richly endowed technical schools, while the departments of law, medicine, dentistry, pharmacy, veterinary science and art of the University of California are also within the city. There are over 200 charitable agencies and 21 hospitals.

Public Buildings.— The cost of rebuilding San Francisco since the great fire of 1906 is estimated at an amount not far short of the sum spent in the construction of the Panama Canal. During this period the city has been building public structures as never before in its history. The most important of the many new building enterprises is a group of public buildings which forms the Civic Centre, for which a bond issue of $8,800,000 was raised. Half of this was spent on a city hall. The public library cost another million. The Auditorium was built by the Panama Pacific Exposition at a cost of $1,275,000. All these buildings are grouped about a spacious plaza, or public square and it is estimated that the paved space will accommodate 20,000 people. Aside from these there is the hall of justice, overlooking the old Plaza, now Portsmouth square, where the first American flag was raised over San Francisco. This building cost $3,500,000. About $3,000,000 has been spent on hospitals. The Union Ferry depot, where the gigantic ferry boats connecting the city with the railroads across the bay land, was erected by the State harbor commissioners in 1896 at a cost of over $1,000,000. It is 659 feet long, 156 feet wide and contains the railroad ticket offices, waiting-rooms, the California development board and the State mining bureau. The United States Appraisers' building also cost over $1,000,000 and contains the internal revenue, secret service and marine offices. Another big Federal building is that of the United States Mint, ranking second in the country. It is kept constantly in operation coining the gold produced on the Pacific Coast. Another big public building which survived the great fire is the post office, a large structure of granite costing over $5,000,000. Among the important educational and scientific institutions may be mentioned the Memorial Museum, Palace of Fine Arts, the Mechanics' Institute, the School of Mechanical Arts, the San Francisco Institute of Art, the Lux School of Industry, the Cogswell Polytechnic Institute. There are scores of hotels, theatres, etc. The State University is at Berkeley and the Leland Stanford University at Palo Alto, 33 miles southeast by rail. Among the big office buildings are the Pacific building, one of the largest reinforced concrete buildings of its kind in the world, the Hobart Building, 21 stories high, and the Claus Spreckels, 19 stories high, which stood throughout the fire that raged on all sides of it.

Manufactures.— In 1914 San Francisco ranked 11th in the United States in the number of its manufacturing establishments. But until the recent discovery of crude petroleum in large quantities in California the city, in common with the rest of the State, suffered a handicap in manufacturing on account of the lack of fuel, which was in part imported from such distant points as England, Australia and Pennsylvania. That difficulty is now removed and crude oil is used for this purpose. There is still the handicap of having to import iron from distant points, but in spite of that the iron industry thrives, as was shown by the shipbuilding that was done during the Great War and is still being continued. The need of mining machinery was really the foundation of the iron industry in San Francisco, and mining machinery is now exported to all parts of the world. The agricultural development of the State has of late been a more important stimulus to the building up of the industries of the city. San Francisco being the nearest port of entry for Hawaiian sugar, much of that product is refined there. Slaughtering and meat packing come next, this industry being supplied by the herds of cattle, flocks of sheep and the hogs which are raised in the interior valleys. The largest fruit and vegetable cannery in the world is located in San Francisco, and the largest shipbuilding plant, drydock, cooperage and cordage factory in the West are also part of the city's industries.

Trade and Commerce.— The commercial importance of San Francisco is even greater than its relative size in regard to population. In 1919 its bank clearings amounted to $5,629,321,142, which was nearly a million dollars more than the combined bank clearings of the four next largest cities on the coast. In its foreign imports it ranked fifth in the United States and the same in the foreign export of domestic goods. Most of the foreign commerce of the United States on the Pacific passes through San Francisco. A large part of the imports and exports of domestic produce from California and neighboring States also passes through the city, and much Californian and other Pacific Coast produce is gathered at San Francisco and shipped out by rail. The city has, in consequence, extensive wharves and warehouses and a large coastwide trade. In 1918 San Francisco imported $245,524,209 worth of goods from foreign countries by sea, and exported to foreign countries by sea goods amounting to $210,562,365. The principal countries to which San Francisco sent domestic products in 1918 were Japan, $59,378,616; Australia and New Zealand, $46,877,524; Mexico and Central America, $8,359,533; Philippine Islands, $30,676,149; China, $13,450,929; Dutch East Indies, $14,657,206. The largest imports of foreign merchandise came from Japan, $17,406,822; China, $21,872,230; Australia and New Zealand, $33,971,032; Straits Settlements, $34,065,606; Dutch East Indies, $30,674,778; British India, $29,790,557. The principal articles imported from abroad during 1918 were rice, sugar, coffee,

Main Portion of SAN FRANCISCO

SCALE 0 ¼ ½ ¾

Rand McNally's 11 x 14 Map of Main Portion of San Francisco
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EXPLANATION
Steam R. R. ——
Street Car Lines – – – –

Explanation:
Railroads ——
Street Car Lines – – – –

OUTLINE MAP OF SAN FRANCISCO
Portion Shown on Main Map in Solid Color.

BAY OF SAN FRANCISCO
PACIFIC OCEAN
PRESIDIO RESERVATION
Fort Mason
Pt. Lobos
Mountain Lake
CITY HALL P.O.
Seal Rocks
Golden Gate Park
Laguna Honda
SAN FRANCISCO
Ocean Side House
India Basin
Dry Dock Basin
Hunter's Pt.
Laguna de la Merced
L. Merced
South Basin
Ocean View
SAN MATEO COUNTY

BAY OF SAN FRANCISCO
Sea Wall
Embarcadero
Freight Slips
27 Lombard St. Pier
25
23
21
19 17 Union St. Pier
15 Green St. Pier
12 Vallejo St. Pier
No. 11 } Broadway Piers
No. 9 }
7 Pacific Pier
5 Jackson St. Pier
3 Washington St. Pier
Passenger Ferry Slips
No. 2 Mission St. Pier
No. 4
No. 6 Howard St. Pier
No. 8
No. 10 Howard St. Pier
No. 12 } Folsom St. Pier
No. 14 }
No. 16 Harrison St. Pier
20
24 Spear St. Pier
28 Merchants Dry Docks
32
34 Fremont St. Pier
Pacific Mail Docks
Santa Fe R. R. Freight Slip
S. P. Co.'s Freight Slip
Associated Oil Co.
CENTRAL BASIN
MISSION ROCK
CHINA BASIN
Islais Creek Channel

SANTA FE R.R.
W. P. Ry. Co.
PIONEER PARK
WASHINGTON SQUARE
N. W. P. R.R.
S. P. CO.
Custom House
U. S. Sub Treasury
SANTA FE R.R.
W. P. RY. CO.
The Call
Flood Building
Emporium
U. S. Mint
Civic Center
City Hall
Post Office
SOU. PAC. CO. PASSENGER DEPOT
CEN. PAC. AND SOU. PAC. FREIGHT DEPOT
Yards of Southern Pacific R. R.
W. P. RY. CO.
OCEAN
COMPANY
LINCOLN PARK
FRANKLIN SQUARE
JACKSON PARK
BUENA VISTA SQUARE
County Hospital

ALTA PLAZA
LAFAYETTE PARK
HAMILTON SQUARE
ELLIOTT PARK
JEFFERSON SQUARE
ALAMO SQUARE
BUENA VISTA PARK
MISSION PARK
SOUTH PARK

Francisco
Chestnut
Lombard
Greenwich
Filbert
Union
Green
Vallejo
Broadway
Pacific
Jackson
Washington
Clay
Sacramento
California
Pine
Bush
Sutter
Post
Geary
O'Farrell
Ellis
Eddy
Turk
Golden Gate
McAllister
Fulton
Grove
Hayes
Fell
Oak
Page
Haight
Waller
Hermann
Market
Duboce
14th
Henry
15th
Beaver
16th
Ford
Dorland
Hancock
17th
Cumberland
18th
19th
20th
Liberty
21st
Hill
22nd
Alvarado
23rd
24th
Elizabeth
Jersey
25th
Clipper
26th
Army
27th
Duncan
28th
Valley
29th
Day
Diamond
Castro
Noe
Sanchez
Church
Dolores
Guerrero
Valencia
Mission
Howard
Folsom
Harrison
Bryant
Hampshire
Potrero
Utah
San Bruno
Kansas
Rhode Island
Deharo
Carolina
Wisconsin
Arkansas
Connecticut
Missouri
Texas
Mississippi
Pennsylvania
Iowa
Indiana
Minnesota
Kentucky
Illinois
Michigan
Georgia
Louisiana
Maryland
Delaware
Virginia
New York
Massachusetts
Oklahoma
Wyoming
Arthur
Burke
Plumas
Mendocino
Calaveras
Amador
Bartlett
Shotwell
Treat
Alabama
Florida
Bessie
Precita
Montezuma
Ripley
Esmeralda
Waithan
Rosseth
Freeson
Baker
Bryant
Brannan
Townsend
Berry
Channel
Hooper
Irwin
Hubbell
South Dwight
Barlow
Eldorado
Alameda
Merritt
Mariposa
Army
Marin
Tulare
Bristol
Napoleon
Islais
Cleveland
Illinois
Georgia
Louisiana
Maryland
Delaware
Virginia
New York
Massachusetts
Oklahoma
Wyoming
Arthur
Burke
Plumas
Mendocino
Calaveras
Amador
Bartlett
Shotwell
Treat
Alabama
Florida
Bessie
Precita
Montezuma
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Bristol
Napoleon
Islais
Cleveland

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copra and tin. The principal articles of foreign export are canned goods, mostly fruit and salmon, raw cotton, iron and steel manufactures, fuel oil, leather and lumber.

Finance and Banking.— In 1918 San Francisco ranked third in the United States in average capital per national bank. Bank statistics indicate that one-half the population are savings-bank depositors. The real and personal property of the city was assessed for purposes of taxation at $780,723,824, of which $481,457,146 was land assessed as 50 per cent of its true value. The ratio of taxation is $2.41 on each $100 of assessed valuation. The city budget for 1918–19 allowed for a total expenditure of $16,015,747. Of this amount $1,315,618 was for public works; $1,003,080 for the board of health; $1,610,000 for fire protection; $1,557,396 for police department; $390,000 for parks and $3,289,652 was for bond interest and redemption.

Population.— There is probably no city in the United States whose population is so cosmopolitan in character as is that of San Franciso. Not only are all the races and nations of Europe represented here, but the brown races are represented here as nowhere else in the whole country. According to the census figures for 1910 the population was 416,912, of which almost exactly half was composed of native whites. The foreign-born whites constituted 43.1 per cent of the whole and 6.4 per cent were of the colored races. The greatest single foreign element was the German which numbered 24,137, after which came 23,151 Irish, 9,815 English and 6,244 French. The Chinese numbered 10,582, showing a marked decrease since previous years, while the Japanese numbered 4,518. There were only 1,642 negroes in the city. In 1920 the population was (U. S. official census) 506,676. For a truer estimate of the size of San Francisco from the point of view of population, some consideration should be given the suburban towns across the bay — Oakland, Alameda, Berkeley and Sausalito — which are really included within the metropolitan area. About 50,000 commuters come into the city daily from these points. Together these suburban districts include another 384,801 population which, if added to that of the city proper, would make San Francisco the fifth most populous city in the United States. In the past San Francisco has at various times been visited by more or less severe earthquakes. On 18 April 1906 it was shaken by an earthquake more violent than any of previous occurrence, but it was the fire caused by the commotion, rather than the earthquake itself, which caused the loss of life and the tremendous loss of property that followed, the latter amounting to over $500,000,000. On account of the city's proximity to the vast forests of the Puget Sound region, which makes timber one of the cheapest building materials, most of the dwellings, even to the larger flat houses, were constructed of wood. The result was that when the water mains were dislocated by the earthquake and the fire companies were unable to extinguish the various outbreaks of fire that occurred simultaneously all over the city, the flames soon swept the entire community. The energy and the rapidity with which the city has not only been rebuilt but improved over its condition previous to the fire has been a source of world-wide wonder.

Influence of the Panama Canal.— That the opening of the Panama Canal, with its consequent shortening of sailing routes between San Francisco and the Atlantic ports of both America and Europe, exerted a powerful influence on the commercial and industrial development of the city is beyond doubt. But the brief period that has elapsed since the opening of the canal, together with the abnormal conditions created by the European War, makes it impossible to determine how potent that influence will yet be. In 1915 San Francisco celebrated the opening of the Panama Canal by holding a great international exposition. See SAN FRANCISCO, PANAMA-PACIFIC INTERNATIONAL EXPOSITION.

History.— The site of San Francisco (originally called Yerba Buena by the Spaniards) was first visited by Europeans in the autumn of 1769. Under date of 28 Nov. 1775 Bucareli ordered a fort, presidio, and a mission (Mission Dolores) founded on the Bay of San Francisco. The expedition to carry out this order left Monterey 12 June 1776 and arrived on the peninsula 27 June. Part of the equipment was sent by sea on the *San Carlos* and arrived on 18 August. The ceremony of taking formal possession was held on 17 September, when the Franciscan friars Palou and Cambon founded the first permanent settlement on the peninsula. The ceremonies attending the founding of the mission at San Francisco were held on the 9th of the following October. Vancouver, in his 'Voyage Round the World' (iii, 9), describes the settlement as it appeared in 1792. The presidio represented the military authority, while the pueblo and the mission stood for the civil and religious factors respectively. The earliest towns of California were organized under the laws of Philip II. And «when a pueblo was once established, no matter how or by whom composed and officially and legally recognized as such, it came immediately within the provisions of the general laws relating to pueblos and was entitled to all the rights and privileges, whether political, municipal or of property, which the laws conferred upon such organizations or corporations» (Cal. Rep., 15, 541); and «among these rights was the right to four square leagues of land, in the form of a square, or in such other form as might be permitted by the nature of the situation» (Cal. Rep., 35, 432). Since San Francisco was bounded on three sides by water it was impossible for the town to have four square leagues of land in a square; a line was, therefore, drawn across the peninsula from east to west and «the four square leagues (exclusive of the military reserve, church buildings, etc.) north of this line, constitute the municipal lands of the pueblo of San Francisco» (Cal. Rep., 16, 230). Before 1834 the Territorial governor and the military commandant of the presidio conducted the government of the town. The former imposed license fees and taxes and the latter acted as a judge of first instance. A little later an ayuntamiento was formed, composed of an *alcalde*, two *regidores* and a *sindico*. Between 8 Jan. 1838 and February 1840 the ayuntamiento was abolished, and the government of the town passed into the hands of justices of the peace. In 1846, when San Francisco passed into American hands, it was merely a Mexican village. After the American occupation the ayuntamiento was re-estab-

lished. Commodore Montgomery, after he had raised the flag of the United States at San Francisco, appointed Lieut. Washington A. Bartlett to be the first alcalde of San Francisco under the new régime. Before the American occupation the alcaldes acted as judges of first instance, and they in a large measure made the law which they executed, "at least, they paid but little regard either to American or Mexican law further than suited their own convenience and conduced to their own profit." In 1847 a common council of six persons was elected, and held its first meeting in September of that year. With this the alcalde assumed some of the functions of a mayor. He presided at the meetings of the council and could give a casting vote in case of a tie, but could not participate in the discussion. At this time the police force of the town consisted of two elected constables. The next year, 1848, gold was discovered in California by James W. Marshall. After the news became known the town appeared as if it had been suddenly stricken with a plague. "Its houses were left unoccupied and unprotected; its former trade ceased; its lots fell to a small part of their value; its two weekly newspapers, *The Californian* and *The California Star,* were suspended in May and June; and the town, deserted by the bulk of its inhabitants, was at one time, without a single officer clothed with civil authority." (Moses, 'The Establishment of Municipal Government in San Francisco,' 35). But in October 1848 an election was held and the town government was reconstituted. At an election held on 1 Aug. 1849 there were 1,516 votes cast, and John W. Geary, candidate for the office of first alcalde, received the whole number.

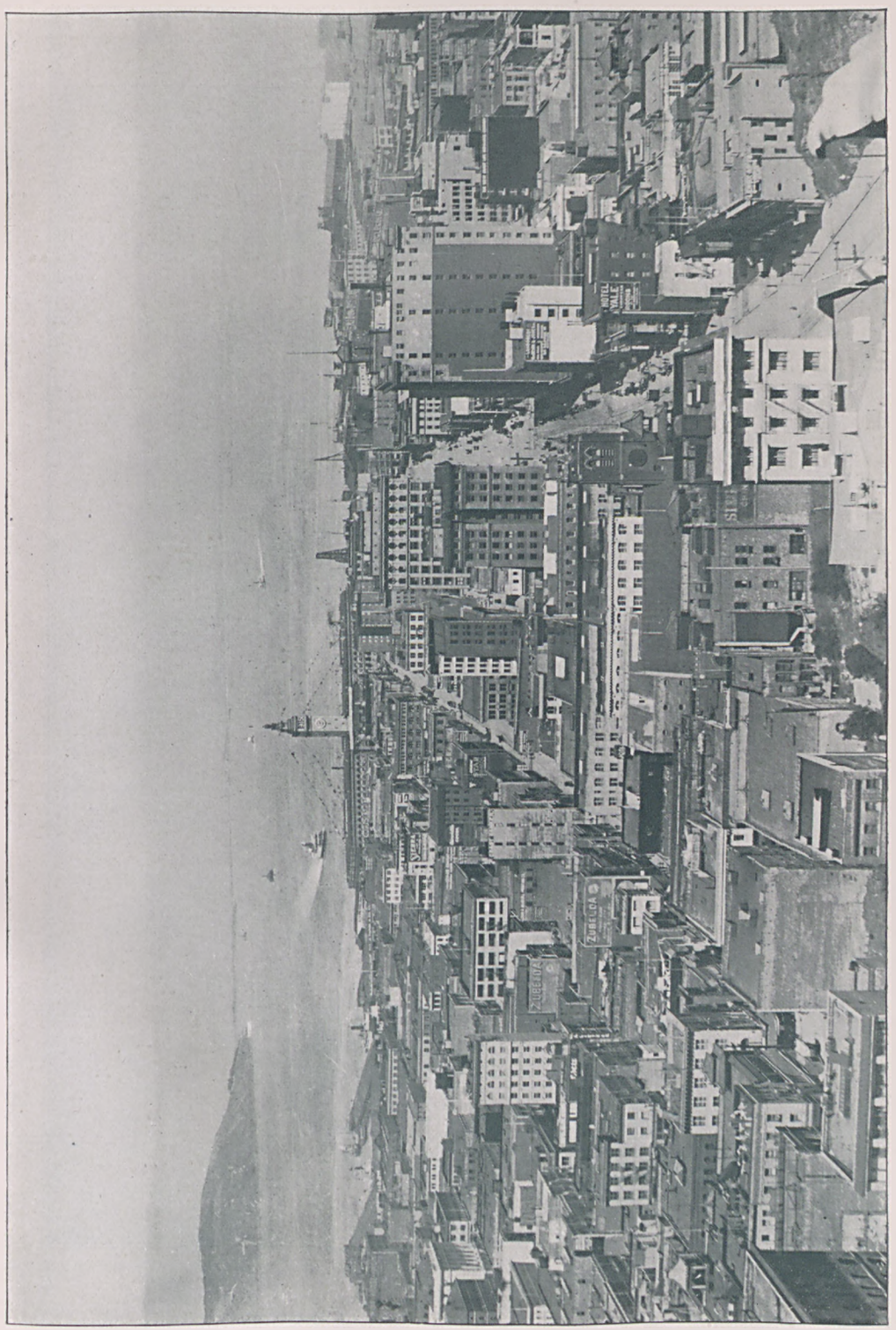
The town was incorporated 15 April 1850. California had already adopted a constitution, but it had not been admitted into the Union. The first municipal election under the charter was held 1 May 1850. The common council held its first meeting on 9 May and proceeded at once to plunder the city treasury. It proposed to fix the salary of the mayor at $10,000 a year; and at the same sum the salaries of the recorder, the marshal and the city attorney. The other officers, including the members of the council, were to have salaries ranging from $4,000 to $6,000 annually. After the admission of California to the Union as a State the city was reincorporated 15 April 1851 and the essential forms of the pre-existing government were retained. When the mail steamer *Oregon* brought the news that California was admitted to the Union (9 Sept. 1850) the inhabitants were "half wild with excitement."

"Business of almost every description was instantly suspended, the courts adjourned in the midst of their work, and men rushed from every house into the streets and towards the wharves, to hail the harbinger of the welcome news. When the steamer rounded Clark's Point and came in front of the city, her masts literally covered with flags and signals, a universal shout arose from ten thousand voices on the wharves, in the streets, upon the hills, house-tops, and the world of shipping in the Bay." And "at night every public thoroughfare was crowded with the rejoicing populace. Almost every large building, all the public saloons and places of amusement were brilliantly illuminated — music from a hundred bands assisted the excitement — numerous balls and parties were hastily got up — bonfires blazed upon the hills, and rockets were incessantly thrown into the air, until the dawn of the following day." (Annals of San Francisco, 293.)

In its early history the city suffered from several fires. These occurred 24 Dec. 1849, 4 May 1850, 14 June 1850, 17 Sept. 1850, 4 May 1851 and 22 June 1851. Two effects of these fires were the use of better materials in building and the formation of various hook and ladder, engine and hose companies. They also called attention to the fact that the city was full of criminals who were making profit out of the fires. This fact and the recognized inefficiency and corruption of the city government led a large number of citizens to organize the famous "Vigilance Committee" which flourished in 1851. In August 1850 the Society of California Pioneers was organized. Its declared purpose was "to cultivate the social virtues of its members, to collect and preserve information connected with the early settlement and conquest of the country and to perpetuate the memory of those whose sagacity, enterprise and love of independence induced them to settle in the wilderness and become the germ of a new State." The great production of gold, while it led immediately to the abandonment of the city, was the first important ground of its prosperity. As the output of the mines became more and more abundant, prices rose, imports multiplied and the population increased; but in 1854 the rise had culminated and the flood of gold began to decline. It then became clear that speculation had outrun safe limits, and there followed a severe crisis in mercantile affairs. By 1856 the crime and corruption which were rife in the city had become intolerable to those who wished to live in a decent and orderly community. Affairs reached a critical stage when Mr. King, editor of the *Bulletin,* was murdered by James P. Casey. His vigorous denunciation of crimes and the criminals who infested the city had given great offense. This act was the final incentive to action. The memory of the Vigilance Committee of 1851 was revived and a new organization effected. On Monday Mr. King died and on Tuesday Casey and another murderer by the name of Cora, who had killed United States Marshal Richardson, were tried by the executive committee of the recently formed organization. On Wednesday, Casey and Cora were hanged in front of the Vigilance headquarters. After several months of activities in defiance of the law, the committee disbanded, having rid the city of many criminals and purged it of much of its political corruption. Although there was a decline in the yield of gold in the years between 1854 and 1860, there was at the same time a marked extension of agriculture; by this the continued prosperity of San Francisco was assured. Then following the marvelous development of the silver mines. They brought a sudden increase of wealth and led to a large amount of excited speculation. San Francisco reaped the principal harvest from the silver mines of Nevada. A small group of its citizens acquired immense fortunes from this source. Their wealth may be compared with that of another small group of San Franciscans who became very rich as the chief leaders in the overland railway enterprise.

Railway connection with the eastern United States was established in 1869; the city is now the western terminus of the great continental railroads and of many short lines. The agitation against Chinese labor was begun in 1877 by Denis Kearney (q.v.). On 23 Oct. 1860 San Francisco was connected with New York by telegraph. The free public library was founded

SAN FRANCISCO, CALIF.



General view of San Francisco, showing the Ferry Building and Bay from Nob Hill



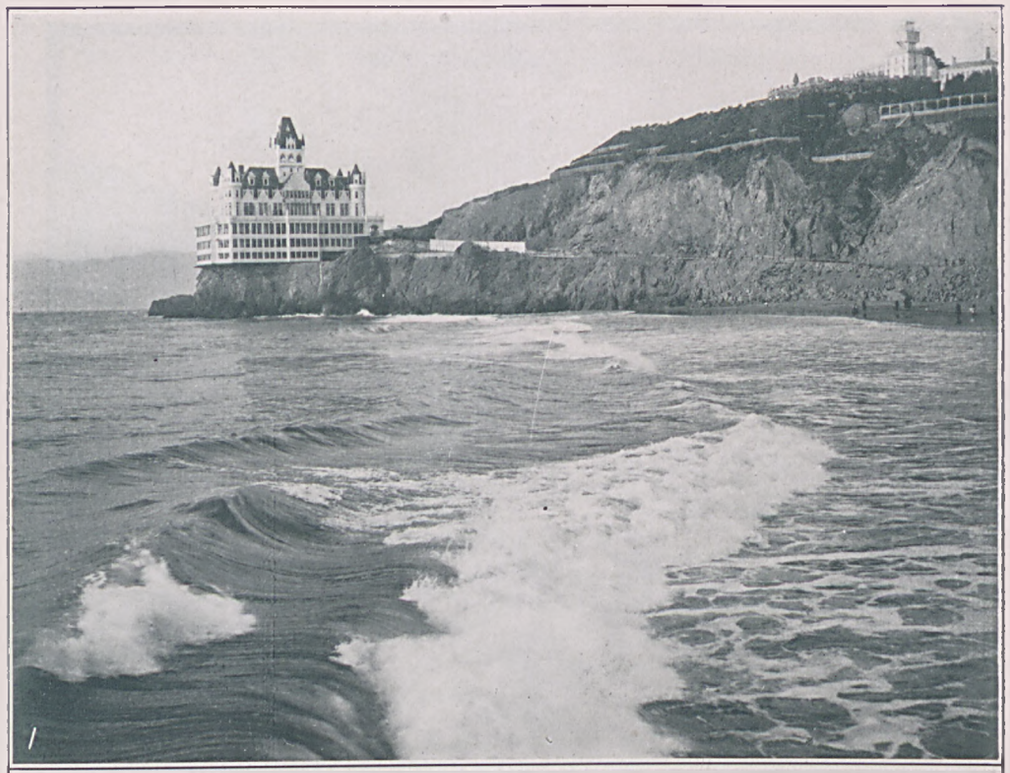
Union Square





1 Seal Rocks and Cliff House

2 San Francisco from the Bay



1 The Cliff House



2 Market Street, looking east

in 1879. In 1880 the forcible ejection of poor squatters from the Sand Lots by the Southern Pacific Railroad led to a conflict in which several persons were killed. A panic on the Stock Exchange in December 1886 caused 14 of the principal brokers to suspend. After years of agitation not unaccompanied by disorders and bloodshed, the Chinese Exclusion Act of 1888 removed a long-standing grievance of California in general and San Francisco in particular. In the following year the city suffered a plague of millions of crickets. In 1891 the police destroyed the joss-houses of the «high-binders»— members of a Chinese secret society of blackmailers. The first shipment of block tin extracted from the Temescal mines, Riverside County, Cal., arrived in San Francisco 15 June 1891. The first great exposition was held in the city in 1894; a new charter was ratified in 1898 and came into effect on 8 Jan. 1900, by which the government was vested in the mayor. In 1903–04 political disturbances led to the conviction and imprisonment of two ex-mayors charged with graft (1906–08), an affair which dragged on until 1911. The principles of the initiative and the referendum were incorporated in a series of amendments to the city charter. During 1906–07 an anti-Japanese campaign raged over the question of segregating Japanese pupils in the public schools.

The most important event in the life of San Francisco was the great earthquake which overwhelmed the city on 18 April 1906, followed by a gigantic conflagration which lasted four days and destroyed 497 city blocks covering an area of five square miles. Some 28,188 buildings were demolished, causing damage to the extent of nearly $1,000,000,000 and the loss of about 500 lives. It was not long, however, before the energy of the citizens succeeded in restoring the place on a grander and more solid scale than before. Within three years some 20,000 new buildings had been erected, mostly fireproof and equipped with the best fire-preventing apparatus. Since the fire 80,092 building permits have been issued, amounting to $329,773,878. From the ashes of that disaster there has arisen a new and magnificent city, with noble edifices ranged on wide, well-paved thoroughfares, cleanly kept and brilliantly lighted.

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L. B. Wilson,
San Francisco Chamber of Commerce.

SAN FRANCISCO BAY, on the coast of California; a land-locked arm of the Pacific Ocean. The channel connecting the bay proper with the ocean is called the Golden Gate. The bay, including San Pablo at its northern point, is 55 miles long and varies in width from 3 to 12 miles. It is the finest bay on the Pacific Coast of the United States. There are a number of islands; Alcatraz, a fortified island, is four miles from the mouth; Angel and Yerba Buena, or Goat Island, are the largest. San Pablo Bay, on the north, is nearly circular in form, about 10 miles across. The Straits of Carquinez connect Suison Bay with San Pablo. Suison Bay is about eight miles long and four miles wide. A number of other smaller bays furnish harbor advantages for several villages and towns. Nearly all the drainage of California enters the ocean through this bay. San Francisco (q.v.), Oakland (q.v.) and a number of smaller places are on its coast.

SAN FRANCISCO, PANAMA-PACIFIC INTERNATIONAL EXPOSITION OF 1915. This exposition was held to celebrate the opening of the Panama Canal and the quatercentenary of the discovery of the Pacific, was opened at San Francsico on 6 Feb. 1915 by President Wilson in Washington. He pressed a gold-studded button, whereupon, over 3,000 miles away, the doors of the various exhibitions swung free and mechanical exhibits began to move. The exposition having been decided on several years before, a competition arose between San Francisco and New Orleans as to which of the two cities should be the seat of the undertaking. Private enterprise in San Francisco promised $7,500,000 and the State and municipality authorized an appropriation each of $5,000,000. In March 1911 Congress selected San Francisco for the undertaking, and on 14 October in the same year President Taft turned the first shovelful of earth on the chosen site. The location fronted San Francisco Bay for nearly two and a half miles from Van Ness avenue and Fort Mason to and within the Presidio. Its average depth was about half a mile from the bay to the residential section of the city, and comprised an area of approximately 625 acres. Divided into three sections, the central space was assigned to the division of exhibits, where 11 magnificent palaces were erected at a cost of about $12,000,000, each devoted to some specific exhibit — art, education, agriculture, transportation, machinery, etc. No charge was made for exhibit space. In 1912 a commission of five visited Europe to invite participation. Invitations were also issued to foreign countries to send warships to assemble with those of the United States. Altogether 42 nations and 43 States produced some 80,000 exhibits, which were reviewed by an international jury of awards. The opening address was delivered by the late Secretary of the Interior Franklin K. Lane of California. It was estimated

that 400,000 persons visited the grounds on the first day. The splendor of the buildings, the innumerable attractions and shows, the beautiful scenery, tournaments, sports, historic collections, pageants and Orientalia presented a spectacle never before witnessed. The total receipts amounted to $12,524,090, of which $4,715,523 was derived from admission fees, the total number of visitors being 18,756,148. The gross receipts from concessions were $7,809,565; net revenue from the same, $1,830,-331. The responsibility for the conduct of the undertaking rested entirely upon the State of California and the city of San Francisco, which, together with corporations and individuals, subscribed over $20,000,000 to finance the scheme.

Bibliography.—'San Francisco: Panama-Pacific Exposition' (1915); 'The Library at the Exposition' (1915); 'The Legacy of the Exposition; Interpretation of the intellectual and moral heritage left to mankind by the world celebration at San Francisco' (1916); 'The Architecture and Landscape Gardening of the Exposition: A pictorial survey,' with an introduction by L. C. Mullgardt (1915); 'Le Science Française: Exposition universelle et internationale de San Francisco' (1915); Brinton, C., 'Impressions of the Art at the Panama-Pacific Exposition' (New York 1916); Foght, H. W., 'Rural and Agricultural Education at the Panama-Pacific Exposition' (Washington 1917); Macomber, B.. 'The Jewel City: Its planning and achievement; its architecture, sculpture, symbolism and music,' etc. (San Francisco 1915); Neuhaus, Prof. E., 'The Art of the Exposition' (1915), and 'The Galleries of the Exposition' (1915); Ryan, W. C., 'Education Exhibits at the Exposition' (Washington 1916).

SAN FRANCISCO MOUNTAIN, a conical mass with area of about 40 square miles rising about 5,000 feet above the Arizona Plateau, a few miles north of Flagstaff, Coconino County, Arizona. Its two highest summits are San Francisco Peak, 12,611 feet and Agassiz Peak, 12,340 feet. The mountain consists of moderately old lavas and breccias, the products of five distinct stages of eruption. The old vent is near the centre and the top has been somewhat lowered by erosion. It is estimated that the lava outflows had a volume of 38 cubic miles and they piled up as a viscous mass on a platform of Kaibab limestone, constituting the general plateau. The mountains are partly covered with pine woods. From the top there is a wonderful view of Grand Canyon to north, Painted Desert and Hopi Buttes to east and many recent cinder cones and lava flows on all sides. Consult Robinson, H. H. (in United States Geological Survey, Prof. Paper 76).

SAN GERMAN, san hĕr-măn', Porto Rico, city, near the southwestern coast, 35 miles southwest of Arecibo. It was settled in 1511. It is in a fertile agricultural region, the prosperity of which has, however, declined. It is a picturesque town, with narrow old-fashioned streets; it contains several churches, a Dominican convent, hospitals and a seminary, and exports sugar, coffee, tobacco and fruit. An efficient public school system has been established under the American control. Pop. city 4,999; pop. municipal district, 25,000.

SAN GERMANO, Italy. See CASSINO.

SAN GIULIANO, sān jool-yä'nō, Antonino, MARQUIS DE, Italian diplomat and statesman: b. Catania, 1852; d. Rome, 16 Oct. 1914. He was educated at the University of Catania, studied law, in 1882 was elected to the House of Deputies and afterward was life Senator. He was Under Secretary for Agriculture in the Giolitti ministry in 1892–93, and Minister of Posts and Telegraphs in the Pelloux ministry in 1899–1900. He was appointed Foreign Minister in the Fortis ministry in December 1905, but early in 1906 was sent as Ambassador to London, remaining in that office until 1910, when he returned home to become Minister for Foreign Affairs in the Luzzatti Cabinet. He also served in this capacity through the succeeding Giolitti and Salandra ministries. Under his tenure of office Italy declared her neutrality in the European War on the grounds that in a war of aggression her treaty obligations to Germany and Austria were not to be enforced. He resigned 3 Oct. 1914, but the government refused to accept his retirement and he directed the affairs of the Foreign Office from his sick room, so far as was possible, until his death, a few days later.

SAN ILDEFONSO, ēl'dā-fōn'sō, or LA GRANJA, Treaties of, two secret agreements between France and Spain, both extremely disadvantageous to Spain. (1) Arranged in 1796, while France was at war with England, pledged the two countries to support each other in time of war with 25 ships and 24,000 troops, of which 6,000 were to be cavalry; an agreement which at once involved Spain in the war then in progress and for which she was severely punished by England. (2) Concluded 1 Oct. 1800 and ratified 30 Oct. 1800, by which Spain re-ceded to France the territory of Louisiana, with the understanding that the territory was not to be sold by France except to Spain; in return for which Napoleon agreed to make the Duke of Parma king, adding either Tuscany or the Roman legations to his territory, so that the population of his kingdom should be above a million. Napoleon, however, disregarded the treaty and sold Louisiana to the United States without consulting Spain.

SAN ISIDRO, ē-sē'drō, Philippines, pueblo, capital of the province of Neuva Ecija, Luzon, on the Grande de la Pampanga River, 48 miles north of Manila. It is a well-built town, at the intersection of several main highways which connect it with Manila, with several points on the Manila and Dagupan Railroad and with other important towns. It is in a fertile agricultural region and has a considerable trade. Pop. 9,800.

SAN JACINTO, ja-sĭn'tō, **Battle of,** in American history, a notable battle of the Mexican War that decided the independence of Texas. It was a desperate engagement between a Mexican force of 1,600 in command of Santa Ana and 783 Texans led by Sam Houston, 21 April 1836. The Mexicans were defeated and utterly routed. The scene of this event was on the banks of the San Jacinto River. 17 miles southeast of the present city of Houston.

SAN JOAQUIN, hō-ä-kēn', Philippines, pueblo, province of Iloilo, island of Panay, on the southeast coast, 31 miles southwest of



Courtesy of Booklovers Magazine — R. I. Aitken, Sculptor

A SYMBOL OF AMERICAN MASTERY OF THE PACIFIC

The Figure of Victory on the Monument erected in San Francisco to Commemorate the Battle of Manila Bay

Iloilo, the provincial capital. It is on the coast highway. Pop. 14,333.

SAN JOAQUIN, a river of California which has its rise in a small glacier southeast of the Yosemite Valley, near Mount Lyell, on the east slope of the Sierra Nevada. It flows southwest about 100 miles; then in Fresno County it changes its course to a northwest direction to its confluence with the Sacramento River; then flows west into Suisun Bay. In Fresno County it receives the waters of Tulare system of lakes through King's River, after which it passes through the Sanjon, or Big Salt, Slough. It is about 350 miles long, and is navigable for 50 miles to Stockton all the year, and in winter and spring about 200 miles farther. The valley through which the San Joaquin flows is noted for its fertility.

SAN JOSÉ, hō-sā', Cal., city, county-seat of Santa Clara County, on the Coyote and the Guadalupe rivers, and on the Southern Pacific Railroad, 47 miles southeast of San Francisco, eight miles from San Francisco Bay, and 28 miles north by east of Santa Cruz. It is connected by railroad with Santa Cruz and Monterey, both on the Pacific, and with San Francisco by three lines of railroad and by water. The first settlement was made about 1770 and the pueblo of San José was established in 1782. It was the State capital under the first constitution of California. The completion of the overland railroad, in 1869, and the further development of transportation facilities, have aided greatly in promoting the prosperity of the city. The form of the city is that of a parallelogram; the streets are wide, well shaded, and clean. The four public parks, the excellent roads extending out into the valley, the equable climate, all contribute toward making San José a desirable residential city. It is situated in a fertile agricultural region, the beautiful Santa Clara Valley, famed for the variety and amount of its fruit. There are 37 large canneries, 30 packing-houses, and shipping establishments connected with the fruit industry, also flour mills, lumber mills, basket and box factories, a foundry, machine shops, yards for marble-cutting and granite polishing, tanneries and several other industrial establishments. The annual output of the farm and fruit products is valued at $25,000,000.

The principal public buildings are the government building, which cost $200,000; the city hall, in the Plaza; the courthouse and Hall of Records, opposite Saint James Park; the Y. M. C. A. building, the Y. W. C. A. building, the churches, schools and charitable institutions. There are 32 churches, representing 12 different denominations; five religious societies not having churches, and several missions, among which are the Florence Night Mission and Christ's Rescue Mission.

The educational institutions are the State Normal School, in Washington Square, a park of 28 acres: the University of the Pacific (Methodist Episcopal); Notre Dame College (Roman Catholic), for young women; Academy of Notre Dame (Roman Catholic); Notre Dame College (Roman Catholic), for boys; Notre Dame Institute (Roman Catholic), a training and technical school for orphans; a public high school, six public kindergartens, public and parish elementary schools, two commercial colleges, four private schools and a public library. The charitable institutions are the Pratt Home for Old Ladies, the O'Connor Sanatorium, the San José Sanatorium and Home, Josephinum Orphanage and the Home of Benevolence, maintained by the Ladies' Benevolent Association. Numerous medicinal mineral springs are in Alum Rock Park, several miles east of the city; area, 1,000 acres.

The annual amount expended for municipal maintenance and operation is about $250,000. The national bank has a capital of $300,000, and the five State banks a combined capital of $2,200,000. Pop. (1920) 39,604.

JAMES T. BROOKS,
Secretary San José Chamber of Commerce.

SAN JOSÉ, Costa Rica, capital of the republic, on an elevated plateau 4,500 feet above sea-level, about 15 miles northwest of Cartago (the ancient capital), with which it is connected by rail. It is in a rich agricultural district and is a centre of commerce, on the international railway from Puerto Limon to Punta Arenas. The most conspicuous buildings are the palaces of the president, and the bishop and the National Palace; the University, to which is attached a medical school and a museum; the restored cathedral, and the National Theatre, a monument of artistic beauty, containing Italian marbles, pillars, columns, statues, and frescoes, and in its elaborate decorations resembling the Library of Congress at Washington. It cost almost $1,000,000. There is a good school system and the city is progressive. The merchants are mostly foreigners. The railroads, banks and electric-light plants were largely built by English capital. The French are the chief coffee-growers; the United States are mainly interested in the railroads, mines, cattle ranches, and the banana industry. Coffee is the principal product. San José is a popular health resort. Pop. 34,784; with suburbs, 49,750.

SAN JOSÉ, Guatemala, the chief port of the republic, on the Pacific Ocean. It is the starting point for the railroad trains to the capital, and a steamer station. The exports are cochineal, indigo, sarsaparilla, wood, flax, coffee, sugar, cotton, hides and rubber. Pop. 1,500.

SAN JOSÉ, Philippines, pueblo, province of Batangas, Luzon, on the Malaquintúbig River, 10 miles north of Batangas, the provincial capital. It is on the main highway, and on the line of a projected railroad, and is a military and telegraph station. Pop. 8,996.

There are also several smaller pueblos of this name: (1) pueblo, province of Bulacán, Luzon; destroyed by the Spaniards in the insurrection; pop. 1,378; (2) pueblo, island of Corregidor, 27 miles southwest of Manila; chief town of the island with good anchorage; pop. 574; (3) pueblo, de Pampanga River, 11 miles northeast of San province of Nueva Ecija, Luzon, on the Grande Isidro; a road centre; pop. 852.

SAN JOSÉ DE BUENAVISTA, dā bwā-nā-vēs'tā, Philippines, pueblo, capital of the province of Antique, Panay; on the west coast. The town has a good harbor, carries on an active trade by sea with Iloilo, and is con-

nected by highway with the other towns of the province. Pop. 6,768.

SAN JOSÉ DE CUCUTA, dä koo'koo-tä. See CUCUTA.

SAN JOSÉ DE LAGONOY, dä lä-gō-noi', pueblo, province of Ambos Camarines, Luzon, 22 miles northeast of Nueva Cáceres. It is the most important town of the sub-district of Lagonoy, which is largely isolated from the rest of the province. Pop. 8,314.

SAN JOSÉ SCALE. See SCALE INSECTS; ORANGE PESTS.

SAN JUAN, Philippines, pueblo, province of La Union, Luzon, on the west coast, four miles north of San Fernando. It is on the main highway. Pop. 11,223. There is also a smaller pueblo of the same name in the province of Bohol.

SAN JUAN, hoo-än, or **SAN JUAN DE LA FRONTERA,** dä lä frōn-tä'rä, Argentina, (1) capital of the province of the same name, east of the River San Juan, on the eastern slope of the lower Cordilleras, north of Mendoza. It is the see of a bishop. The principal buildings are the bank, national college, normal school, large seminary, hospital and custom house. There is some export trade in wine and cattle. Pop. 15,262. (2) The province covers an area of 37,865 square miles. On the west the Cordilleras are interspersed with fertile valleys, on the east are found salt steppes or pampas. In the Andes lofty peaks rise to the height of 5,580 (Cerro Gordo) to 6,798 (Meredario) metres. East of the Rio Jachal are high mountains, then follows the chain of the Sierra Huerta. The principal streams are Rio Vermegio and Rio Sanjon; on the southern frontier extends the large lake of Guanacache. Gold and copper mines are operated. The climate is mild and the country well watered. Grapes, olives and wheat are extensively cultivated. Pop. 130,412.

SAN JUAN, or **SAN JUAN DE PORTO RICO,** Porto Rico, city, capital of the island; built on a small island adjacent to the northeastern coast, connected with the mainland by a bridge. It was founded in 1511 by Ponce de Leon, and was strongly fortified. It was attacked by the Dutch in 1625 and on several occasions by the English, the last time in 1797, when a large force under Abercrombie laid siege to the city; its fortifications, however, rendered it impregnable. In 1898 it was occupied by American troops, and remains the seat of government for the island under American rule. The main part of the town is enclosed by mediæval ramparts and defended by Morro Castle, at the entrance of the harbor, forts Sant Elena and San German, and the citadel of San Cristobal. Within the walls the city is laid out in regular squares; the houses are substantially built and the streets well paved. Sanitation was neglected under Spanish rule, but after the American occupation the best sanitary measures were strictly enforced, and the general health of the city greatly improved. It contains a number of notable public buildings, including the bishop's palace, a large cathedral, the old government building, the city hall, the casa blanca, the custom house, a military hospital, an arsenal, a Jesuit college, a Carnegie library, and a theatre. It has a trolley car system which connects it with the pretty suburban towns, Santurce and Rio Piedras. The harbor is one of the best in the West Indies, affording anchorage for the largest ships. The entrance, however, is very narrow and difficult for navigation. In 1912 a harbor board was created and bonds totaling $500,000 were authorized, to which $100,000 was later added, for the purpose of enlarging and improving the harbor. This work will transform the city into the most commodious, safe and modern port in this part of the world. Another local improvement of much importance is the new bulkhead completed in 1917. This is of reinforced concrete on piles, is 2,000 feet long, has its eastern end covered with a steel shed 841 feet long and 24–54 feet wide, and provides a depth of water of 18–24 feet. At the same time the marginal boulevard was undergoing a radical transformation in keeping with the new harbor work. In the calendar year 1917 the imports of merchandise at the port of San Juan from the United States had a value of $3,866,565, and the exports to the United States $9,535,712. After the United States entered the World War the citizens of San Juan organized a Red Cross chapter, and subscribed liberally to the various Liberty loans. The public school system of graded schools includes a high school, which is open to pupils from all parts of the island. There are also several special schools established by the government, including night schools, an industrial school, an experimental kindergarten, and a school for trained nurses. Pop. (1899) 32,048; (1910) 48,716.

SAN JUAN, Central America, a river forming the outlet of Lake Nicaragua, and flowing southeastward on the boundary between Nicaragua and Costa Rica into the Caribbean Sea. Part of it would have formed a link in the interoceanic waterway if the Nicaragua Canal had been decided on. It is 130 miles long, and for the greater part of its course is a broad, deep and tranquil stream. It is, however, completely blocked at five places by rapids, of which the Machuca Rapids are the largest. The river enters the sea through a large delta, one arm of which forms the harbor of Greytown, though the bar is too shallow for large vessels.

SAN JUAN BAUTISTA, bow-tēs'tä, Mexico, the capital of the state of Tabasco, situated on the Rio Grijalva near the centre of the state. It is built on low and level ground, has street-car lines and several pretentious buildings, such as the government palace, a theatre, and several churches. It is the trade depot for the interior of Tabasco and northern Chiapas. Pop. about 10,000.

SAN JUAN DE BOCBOC, dä bōk-bōk'. Philippines, pueblo, province of Batangas, Luzon, on Tayabas Bay at the mouth of the Sinturis (or Lanay) River. There are two towns, the old town built directly on the bay, the new town further inland on the river. Many horses are raised in the surrounding region. Pop. 14,017.

SAN JUAN BOUNDARIES. See BOUNDARIES OF THE UNITED STATES.

SAN JUAN HILL, Battle of. See SANTIAGO DE CUBA.

SAN JUAN ISLANDS, a group belonging to the State of Washington. They begin in the Strait of Georgia and extend south into Puget Sound. The largest islands of the group are San Juan, Oreas, Lopez and Shaw. In 1850 these islands were claimed by both the United States and Great Britain, and both American and British garrisons were on the islands. See SAN JUAN QUESTION.

SAN JUAN DEL MEZQUITAL, dĕl mäs-kē-täl', Mexico, a town in the northwestern part of the state of Zacatecas.

SAN JUAN MOUNTAINS. The southern part of the western range of the Rocky Mountains in southwestern Colorado, mostly in San Juan, San Miguel, Mineral, Hinsdale, Archuleta, Rio Grande and Conejos counties. About 100 miles long from northwest to southeast. Many of its peaks are more than 13,000 feet above sea-level, Mount Wilson 14,250 feet high being the highest. These mountains consist of a great variety of sedimentary and igneous rocks with many rich mines of various kinds notably in the Silverton, Telluride and Ouray districts. A southern extension of the same uplift extends along the east side of Rio Arriba County, New Mexico.

SAN JUAN QUESTION, in American history an early boundary line dispute between the United States and Great Britain. In negotiating the treaty of 1846, by which the 49th parallel, from the Rocky Mountains to the sea, was made the boundary, a controversy arose concerning the course of the line through the channel which divides Vancouver Island from the mainland. The Americans contended for the Canal de Haro, the British for the Rosario Strait. To avoid conflict, it was decided that both nations occupy the island of San Juan at opposite ends. In 1872 Emperor Wilhelm I of Germany, acting as arbitrator, decided for the United States.

SAN JUAN DE NICARAGUA, dä nē-kä-rä'gwä, or **SAN JUAN DEL NORTE,** dĕl nōr'tä. See GREYTOWN.

SAN JUAN DEL RIO, dĕl rē'ō, Mexico, a town in the state of Querétaro, situated about 30 miles southeast of Querétaro, with which it is connected by railway. It is surrounded by beautiful gardens, and there are important silver mines in the neighborhood.

SAN JUAN RIVER. One of the large branches of Colorado River in southeastern Utah and northwestern New Mexico with its main affluent Rio de las Animas heading in the San Juan Mountains in southwestern Colorado. Total length about 250 miles. The lower part of its course is in a deep canyon which opens into that of Colorado River above Glen Canyon.

SAN JUAN DEL SUR, dĕl soor, Nicaragua, a port on the Pacific Coast in the southwestern corner of the republic. It has a safe harbor and is the commercial outlet for the products of southwestern Nicaragua. It has submarine cable connection with Mexico and Panama, and is a station for regular steamers. The terminus of the proposed Nicaragua Canal would have come a little to the north of the town.

SAN JUAN DE ULÚA, dä oo-loo'ä, or **ULLOA,** Mexico, a fort defense in the east of the harbor of Vera Cruz, standing upon a small island of its own name. Here Cortes made his first landing in 1519. The fort was built in the 17th century and was of great strength. It has figured conspicuously in the history of Mexico.

SAN LEANDRO, Cal., city in Alameda County, on San Leandro Creek, 17 miles east of San Francisco, on the Southern Pacific and the Western Pacific railroads. There are canneries, manufactures of farm implements, hay pressing works and a considerable lumber industry. Pop. (1920) 5,703.

SAN LORENZO EL REAL, Treaty of. See BOUNDARIES OF THE UNITED STATES.

SAN LUCAR DE BARRAMEDA, loo'kär dä bär-rä-mä'thä, Spain, a seaport, province of Cadiz, Andalusia, at the mouth of the Guadalquivir, 18 miles north of Cadiz. The most conspicuous buildings are several convents and the palace of the Duc de Montpensier, containing valuable art treasures; the ruins of a Moorish castle; churches; townhouse and the hospital of St. George, which dates from 1517. There are good schools directed by religious orders generally. The chief occupations of the inhabitants are fishing and the culture of grapes, olives, tropical fruits and vegetables, and there is considerable trade in sherry wines. The chief imports are coal from England; sulphur and vegetables from France: exports, salt, wine, fruit and oats. Columbus embarked from this point on his third voyage, and Magellan on his voyage of 1519. Pop. about 25,000.

SAN LUIS, loo-ēs', or **SAN LUIS DE LA PUNTA,** Argentina, (1) Capital of the province of that name, at the southern extremity of the Sierra of San Luis, on the Chorillo, 480 miles northwest of Buenos Aires on the transcontinental railway. It has a national college, normal and primary schools and a branch bank; also water supply. The chief industries are the manufacture of *ponchos*, and trade in horses, hides and wool. It was founded in 1597, consists of adobe huts, and is surrounded by forests of ferns. Pop. (est.) 10,000. (2) The province is situated in the central west of the republic, with an area of 29,035 square miles. At the northeast terminates the Sierra de Cordoba; through the northeast extends the Sierra de San Luis rich in copper and precious metals, which are, however, little exploited. In the south extend salty pampas. The climate is dry and healthful, marked by great extremes. The rivers are not navigable; transportation facilities are poor, and there is little industry. Pop. 126,895.

SAN LUIS OBISPO, ō-bēs'pō, Cal., city, county-seat of San Luis Obispo County, on the Southern Pacific Railroad, about nine miles from Port San Luis (Port Harford) on San Luis Obispo Bay, an arm of the Pacific Ocean, and midway between San Francisco and Los Angeles. It is in an agricultural and stock-raising region. The industries are chiefly connected with the farm and dairy products, the cultivation and shipping of fruits and nuts, and the transportation and refining of oil. Port San Luis is the most important oil port in California. The educational institutions are

the California Polytechnic School (State), a high school, public and parish schools. There are two banks in San Luis Obispo, one State bank and one national bank, with combined total assets of over $4,147,533. Pop. 5,895.

SAN LUIS POTOSI, pō-tō-sē′, Mexico, an inland state. bounded by the states of Coahuila, Nuevo Leon, Tamaulipas, Veracruz, Hidalgo, Queretaro, Guanajuato, Jalisco, and Zacatecas. It is divided into 13 districts, has an area of 25,316 square miles, and a population of 627,800. Its surface for the most part lies within the great plateau of Mexico, but the southeastern part in the valley of the Panuco is several thousand feet lower than the rest of the state. Fever and malaria are prevalent in the low elevations but the climate is healthful in the part of the state on the plateau. The soil is fertile and there is an abundance of forest. Agriculture is in a backward state. Tropical fruits are grown to some extent and stock-raising is becoming important. Gold, copper, lead, silver, iron, mercury, zinc, and petroleum are found in considerable quantities, and the mining and extraction of these is now the state's leading industry. Manufacturing and commerce have shown a decided upward trend in recent years. The principal cities and towns are San Luis Potosi (the capital) (q.v.), Catorce, Matehuala, and Rio Verde.

SAN LUIS POTOSI, Mexico, capital of the state of San Luis Potosi and fourth largest city in the republic, 326 miles from Mexico City by the National Railway, 477 miles from the United States border at Laredo, Texas, and 275 miles from the Gulf of Mexico at Tampico by the Mexican Central Railway, altitude 6,250 feet above the sea. It is the centre of an important mineral and smelting interest, extensive ore deposits existing in almost every direction and is the home of the greatest silver-lead reduction works in the world,— the smelting plant of the Compania Metalurgica Mexicana, with a capacity of 1,000 tons daily and requiring the services of 1,400 men in all departments. As a distributing and general business centre the city is regarded as one of the most important and promising in the republic. The opening of the port of Tampico has proven very beneficial to its commercial interests. Its manufacturing industries include clothing, furniture, cotton goods, tallow and other articles of commercial importance. It has a street railway, telephone service and an excellent electric lighting system. The governor's palace of rose colored stone is an imposing building and the cathedral is one of the notable ones of the country. A university, The Instituto Scientifico, in which the professions and exact sciences are taught, is the principal educational institution of the city. There are also a scientific museum, with a library of over 15,000 volumes and five other libraries, with a total of some 10,000 volumes. A fine statue of the patriot Hidalgo, occupies a prominent place in the Alameda or principal public square. This city is the seat of one of the most important Catholic archbishoprics in the republic. The local bank of issue is the Bank of San Luis Potosi, with a capital of $1,100,000; but there are branches or agencies of the National Bank and the London and Mexico Bank, both of Mexico City. The city was founded about 1550 and has played an important part in the Mexican civil wars; in 1863 was the seat of government under Juarez; later was occupied by Bazaine and recovered by Juarez in 1867. Pop. 68,022.

SAN MARCOS, mär′kŏs, Tex., town and county-seat of Hays County, on the San Marcos River and on the International and Great Northern and the Missouri, Kansas and Texas railroads, 30 miles southwest of Austin. It became the county-seat on the organization of the county in 1848. It is in an agricultural region, cotton and corn being the chief products; stock-raising is also carried on in the vicinity. The town contains steam cotton-gins and cottonseed-oil mills, also a United States fish culture station. There are two national banks with a combined capital of $130,000. A group of boiling springs is located within the town limits. It has a public high school, established in 1891; and contains the grounds of the Texas Chautauqua Association. It is also the seat of the Coronal Institute, a secondary school established by the Methodist Episcopal Church South in 1879 and of the Lone Star Business School, the Southwest Texas Normal, established in 1905, with an enrolment of 1,000 students, the San Marcos Baptist Academy, established in 1909 and costing between $175,000 and $200,000 and the Southwestern Conservatory of Music, established in 1915 and enrolling 110 the first term. A summer resort affording accommodation for 500 is located here. The town has seven churches and three missions. It is on the government highway between Austin and San Antonio. Pop. 4,527.

SAN MARINO, mä-rē′nō, Europe, the smallest republic in the world and claiming to be the oldest state in Europe, comprises an area of 38 square miles, enclosed by Italian territory, among the terminating spurs of the Apennines near the Adriatic Coast. The government is peculiar and eminently democratic; Its legislative power is vested in a Great Council of 60 members elected by popular vote, two of whom are appointed every six months to act as regents and a smaller Council of 12 members, divided into four congresses or departments. The executive authority is exercised by the regents. There is no public debt. The town, standing on a mountainous crag 2,420 feet high, was built round a hermitage dating from 441 and is surrounded by a great wall with forts. But one road enters the town. Borgo is an aristocratic suburb at the foot of the hill. Silk is the principal manufacture. There are numerous massive and stately buildings including the governor's palace and six churches, one of which contains the tomb and statue of Saint Marino, besides several schools, a museum, theatre, town-hall and convents. Agriculture is the chief pursuit. A new treaty of friendship with Italy was signed in 1907 and revised in 1908 and 1914. The republic has extradition treaties with England, Belgium, Holland and the United States. On 24 May 1915 the republic declared war against Austria-Hungary, the day following the similar Italian declaration. Pop. 11,513.

SAN MARINO, Order of. See ORDERS, ROYAL.

SAN MARTIN, José de, hō-sā′ dā sän mär-tēn′, South American general: b. Yapeyu, Argentina, 25 Feb. 1778; d. Boulogne, France, 17 Aug. 1850. He was educated in Spain and entered the army in 1791. In 1811 he attained the rank of lieutenant-colonel, but resigned and sailed for Buenos Aires in 1812, where he offered his services in the cause of independence. He defeated the viceroy Vigodet on 13 Jan. 1813 at San Lorenzo and the next year, being appointed commander-in-chief of the army of Upper Peru, prepared to attack the Spanish forces by an approach through Chile. An army of invasion was drilled for two years at Mendoza, whence San Martin began 17 Jan. 1817, his famous march over the Andes, leading his army through the Uspallata Pass. On 12 Feb. 1817, he gained the victory of Chacabuco and captured and occupied Santiago 15 February. He was defeated on 19 March 1818 at Cancha Rayada, but repulsed the royalists on 5 April at the Maipo and drove the Spaniards from Chile. He next invaded Peru and captured and occupied Lima, 12 July 1821. On 27 July he proclaimed the independence of Peru and on 3 August was appointed protector. He resigned his office to the Peruvian Congress, 22 August, leaving Bolivar to complete the independence of Peru. He then went to France and lived there till his death.

SAN MIGUEL, sän mē-gĕl′, Salvador, the capital of a department of the same name on the San Miguel River, nine miles east of the active volcano of San Miguel (7,775 feet), and 70 miles southeast of San Salvador. It is an active commercial and agricultural centre, noted for its great annual fair. Indigo is an important article of commerce. The climate is malarious. Pop. 24,768.

SAN MIGUEL ALLENDE, äl-yĕn′dā, Mexico, a manufacturing city in the state of Guanajuato, on the Rio de la Lara and on the Mexican National Railroad, 34 miles north of Ceyala; named after the Mexican patriot, Gen. Ignacio Allende (1779–1811), who was born here. Woolens, saddles and weapons are the chief articles produced. Pop. 39,000.

SAN MIGUEL DE MAYUMO, dā mä-yoo′ mō, Philippines, Pueblo, province of Bulacán, Luzón, on the San Miguel River, 26 miles north of Bulacán. It is on the main highway at the junction of several others; and the river is navigable for native craft. It is the commercial centre of a fertile agricultural region; excellent timber is obtained on the surrounding mountains; iron is mined at Sibul, eight miles distant; and gold and petroleum are known to exist in the vicinity, but are without paying exploitation, the chief manufactures are cloth goods. The climate is especially healthful and there are medicinal springs in the vicinity of the iron mines. The town suffered considerable damage during the insurrection on account of its proximity to insurgents' hiding places in the mountains. Pop. 14,919.

SAN MINIATO, mē-nē-ä′tō, Italy, in the province of Florence, 21 miles west of the city of Florence, on the Arno. The ancient cathedral dates from the 10th century and is adorned with many interesting monuments. Glass, olive oil, hats and leather are manufactured. The town has considerable historical interest, especially as being the cradle of the Napoleon family.

SAN NICOLAS, ne-kō-läs′, Philippines, (1) Former pueblo of the province of Cebú, incorporated as a part of the municipality of Cebú, the provincial capital in 1901. Pop. 18,330. (2) Pueblo, province of Ilocos Norte, on the Laoag River. three miles south of Laoag. It is on the coast highway. Pop. 10,880. (3) Pueblo, province of Pangasinán, near the Agno River, 34 miles east of Lingayén. It is connected with Lingayén and also with towns to the south by highway. Pop. 9,780.

SAN NICOLAS, or **SAN NICOLAS DE LOS ARROYOS,** dā lōs är-rō′yōs, Argentina, a town in the province of Buenos Aires, situated at the head of the delta of the Paraná, 35 miles southeast of Rosario, with which it is connected by rail. It is an important railroad centre and a station for ocean steamers. It has electric light and street railways, large beef-packing houses, flour-mills and distilleries. The chief exports are wool and cattle products.

SAN PABLO, pä′blō, Philippines, pueblo, province of Laguna, Luzon; 17 miles south by west of Santa Cruz. It is on the main road from Santa Cruz to Tayabas, at the junction of other highways. It is the centre of an area of volcanic elevations, with five small mountain lakes in the vicinity. There are indications of valuable mineral deposits. Pop. 22,612.

SAN PABLO BAY. See SAN FRANCISCO BAY.

SAN PEDRO, pē′drō, Cal., city and port of entry, annexed to Los Angeles, 1909; on San Pedro Bay, an inlet of the Pacific Ocean and on the San Pedro, Los Angeles and Southern Line and the Southern Pacific railroads, 22 miles south of Los Angeles. The harbor, enlarged and otherwise improved by the Federal government is one of the best on the Pacific Coast. The breakwater, 8,000 feet long, cost over $3,000,000. The harbor improvements, completed in 1904, afford a clear depth of 30 feet, permitting the largest vessels to enter the inner harbor. San Pedro is in an agricultural region and near sections in which there is considerable mining. Its chief industries are connected with exporting grain, fruit and minerals. Pop. (1920, United States Census) 15,000. See LOS ANGELES.

SAN PEDRO, Paraguay, a town situated on a branch of the Paraguay River, about 100 miles north of Asunción. It is accessible for small steamers and exports maté. Pop. 8,700.

SAN PIOQUINTO, pē′ō kēn′tō, Philippines, a port on the western coast of Camiguin Island, north of Luzon, extending two miles inland and three miles wide. It is sheltered by Font Island lying in the middle of the entrance with a channel on each side. Near the entrance to the south is a boiling spring of salt water, regarded as evidence of comparatively recent volcanic activity in this and the Batanes group on the north and the north sections of Luzon on the south. A stream of fresh water enters this harbor. It is one of the principal cruising stations of the United States navy in the waters of the northern Philippines; here, on 3 May 1899 the United States steamship *Concord*

raised the United States flag; and here, later, the crew of the wrecked United States steamship *Charleston* camped till rescued.

SAN RAFAEL, rā-fā-ĕl′, Cal., town, county-seat of Marin County, on San Pablo Strait and on the Northwestern Pacific Railroad, 15 miles north of San Francisco. It is the centre of a stock-raising, dairying, agricultural and suburban region and has frequent communication with San Francisco both by railroad and ferry. It is situated near Mount Tamalpais and is a well-known health resort. It contains Saint Vincent's Male Orphan Asylum. It has a public high school, with a library of about 16,000 volumes and is the seat of San Rafael Institute, the Dominican College (for girls), a Roman Catholic secondary institution, the Hitchcock Military Academy and the Mount Tamalpais Military Academy. Pop. (1920) 5,512. Also has water transportation with San Francisco Bay; $70,000 municipal bath house (natatorium); about six miles of paved streets; $3,000,000 municipal water system; San Francisco Theological Seminary (Presbyterian); Presbyterian Orphange and Farm; now city of second class governed by city council and city manager; picturesque scenic suburban city with particularly salubrious climate free from fogs and winds.

SAN REMO, rā′mō, Italy, city and seaport, in the province of Porto Maurizio, 30 miles northeast of Nice, on the Mediterranean, in the famous Riviera district and a much frequented health and pleasure resort. The town is terraced, the ancient upper town with narrow and crooked streets lined with lofty buildings forming a strong contrast to the modern edifices of the lower town. Among its attractions are the cathedral, the Santurio della Guardia, the Santurio dell'Assunta with four handsome alabaster pillars and the palace of the Marquis Borrea d'Olmo, the latter containing a noted picture gallery. The city is so ancient that its origin is obscure. It was self-governed in 1170 and one of its bishops later sold it to Genoa. Pop. about 22,000.

SAN SALVADOR, săl′va-dôr, Salvador, city and capital of the republic, situated near the base of the volcano San Salvador about 25 miles from the port of La Libertad on the Pacific Coast with which it has rail connection, in a pleasant valley at an altitude of 2,102 feet, the cone of the volcano rising distinctly above it. The city is well laid out, having many pleasant parks and suburban resorts. It is subject to earthquakes and this fact has modified the methods of house construction, all the houses being low and surrounded by open areas. Its most noteworthy building is the Casa Blanca (white house), the residence of the President. Other notable structures are the library, university and observatory. The city is an important industrial centre; its manufactured products including soap, cigars, candles, cotton cloth, sugar and spirits. It is also a thriving commercial centre, doing a large trade in the products of the region, especially indigo and tobacco. It is the official residence of the United States Minister to El Salvador and the seat of a United States consul-general. Jorge de Alvarado founded San Salvador in 1525. An earthquake all but destroyed it in 1854, another laid it low in 1873 and that of 1917, when millions of dollars' worth of property were destroyed, is still vividly remembered. In spite of these fateful blows from nature and devastating waves of man-made revolutions, San Salvador to-day is reckoned among the important cities of the American mid-continent. Pop. 60,000.

SAN SEBASTIAN, să-băs-tē-ăn′, Spain, capital of the province of Guipuzcoa on the Bay of Biscay, 42 miles northwest of Pampeluna, is a port and a natural and fortified stronghold. It has been the summer resort of the Cortes since 1886. The principal buildings are the churches of San Maria and San Vicente, a nunnery, the courthouse, the schools of navigation, commerce, etc., theatre and hospitals. In the environs, on the Bay of La Concha, is the royal palace. The industries of the town have greatly developed and include saw and flour mills, breweries, manufactures of preserves, soap, candles, glass and paper, and there is considerable trade in English and French goods and in normal years, exports of wool, flour, wine, cutlery, firearms, copperore and lead, and imports of sugar, silk, cotton and linen goods, cocoa, machinery and salted fish. San Sebastian is an aristocratic watering place, bathing, bull-fights, gambling and local festivities attracting many visitors. Historically it has played an important rôle and has sustained several sieges, the most memorable in 1813, when Wellington took it by storm. Pop. (1910) 49,008.

SAN STEFANO, stĕf′a-nō, **Treaty of,** a peace treaty of the Russo-Turkish war, concluded 3 March 1878, at San Stefano, a port on the Sea of Marmora. By its terms Bulgaria was to become a principality, extending from the Danube to the Ægean, and Rumania, Servia and Montenegro were recognized as independent. Russia was to receive a war indemnity of 300,000,000 rubles and the Dobrudja, Kars, Batum and other possessions. The congress held at Berlin, in June and July, 1878, greatly altered the provisions of this treaty, effecting peace on somewhat more moderate terms.

SAN VICENTE, vē-sān′tā, or **SAN VICENTE DE AUSTRIA,** Salvador, 23 miles east of the capital, lies almost central in the republic close to an extinct volcano of its own name. It is an attractive town; its handsome church is the only conspicuous building. It occupies a fertile region and the chief occupations are tobacco and indigo planting; and the manufacture of the former, and of clothes, silks, shoes, hats. The annual fair is much frequented. The town suffered from an earthquake in 1899. Pop. about 18,000.

SAN XAVIER DEL BAC, Spanish mission in Santa Cruz valley, eight miles south of Tucson, Arizona, established about 1687 by fathers Kino and Salvatieraz, Jesuit missionaries to the Indians. The present church, erected about 1727, has the form of a cross 105 feet long and 27 feet wide inside. It is built of adobe with stone foundation and covering of fine cement. It faces south with a beautiful façade in a good state of preservation, highly ornamented with scroll work adorned with the arms of the Franciscan Order. Two towers, one never finished, surmount the front. Over the main chapel is a massive dome of

splendid proportions and lightness. Several fine frescoes remain and there are many admirable and interesting architectural features and adornments. Its preservation is due to the devotion of Papago Indians who took charge when the priests were driven off by Apaches in 1827.

SANAA, să-nä′, or **SANA,** Arabia, the capital of Yemen, lies in a high and well-watered valley, 260 miles north of Aden and 140 miles northeast of Hodeida on the Red Sea. It is of great antiquity, massively built and surrounded by a wall. Each street is arranged with reference to business confined to that locality, according to Asiatic custom. The principal mosque is of recent construction, an Oriental building with fine domes and minarets. The chief manufactures are gold and silver articles, gunpowder, sword-blades, etc. Trade is in coffee — the great staple — dried fruits and raisins. Sanaa was long the capital of the independent Imams of Yemen, but in 1872 came under Turkish rule, since when its commercial importance has declined. Pop. 45,000, of whom about 20,000 are Jews.

SANATORIUM, a term used interchangeably with sanitarium, specifically a health retreat, strictly a place where the treatment is prophylactic instead of therapeutic; in a broad sense a place for rest cure.

SANBORN, săn′bĕrn, **Alvan Francis,** American journalist: b. Marlborough, Mass., 8 July 1866. He was graduated from Amherst in 1887 and filled several journalistic positions, among them that of Paris correspondent of New York and Boston periodicals from 1899. He published 'Moody's Lodging House and Other Tenement Sketches' (1895); 'Meg McIntyre's Raffle and Other Stories' (1896); 'Paris and the Social Revolution' (1903), besides editing 'Masterpieces of Prose' (1893); 'Reminiscences of Richard Lathers' (1907), etc.

SANBORN, Franklin Benjamin, American philanthropist and author: b. Hampton Falls, N. H., 15 Dec. 1831; d. 24 Feb. 1917. He was graduated from Harvard in 1855, became active in politics as a member of the Free Soil party in New Hampshire and Massachusetts, was for a time secretary to the Massachusetts State Kansas committee, and aided John Brown in the invasion of Harper's Ferry after having vainly opposed the scheme. From 1863 to 1868 he was an editor of the Boston *Commonwealth*; in October 1863 became secretary of the Massachusetts State board of charities, the first established in America; and in 1865 assisted in the organization of the American Social Science Association, of which he was until 1897 secretary. With Bronson Alcott and W. T. Harris he founded the Concord school of philosophy in 1879; and he was also an organizer of the National Prison Association (1871), and the National conference of charities (1865). Among his publications are 'Life and Letters of John Brown' (1885); biographies of Thoreau (1882), Alcott (1883), Dr. Howe (1891), and Dr. Earle (1898); 'The Personality of Thoreau' (1902) and 'The Personality of Emerson' (1903). He was through all his active life a journalist, having begun to contribute to the New Hampshire *Independent Democrat* in 1849, to the Boston *Transcript* in 1852, to the *Christian Register* in 1853, the Boston *Traveller* in 1856, and to the Springfield *Republican* in 1856. He was editor of the *Republican* after June 1868, furnishing from three to six columns a week. Between 1900 and 1917 he published Ellery Channing's 'Poems of 65 years' (1902); Channing's 'Thoreau the Poet-Naturalist' with additions (1903); Thoreau's 'The Service' (1902); 'Bronson Alcott at Fruitlands' (1908), and 'Hawthorne and His Friends' (1908); Recollections of 70 Years' (2 vols., 1909), and 'Sixty years in Concord' (1916). A final life of Thoreau, 'Thoreau and his Earliest Writings' (1916). He also edited two volumes of 'Theodore Parkers Writings' (1914), introduced Newton's 'Lincoln and Herndon' (1913), and wrote brief biographies of Dr. Langdon, president of Harvard College, of Ellery Channing and of Mrs. Abbott-Wood of Lowell. For 30 years he edited the *American Journal of Social Science,* (1867–97), and contributed largely to the Proceedings of the Massachusetts Historical Society (1903–15), and edited for the Boston Bibliophile Society five volumes of Thoreau's manuscripts, a volume of the Shelley-Payne correspondence, and one of the Fragments and Letters of T. L. Peacock.

SANBORN, John Benjamin, American military officer: b. Epsom, N. H., 5 Dec. 1826; d. 1904. He was educated at Dartmouth College, studied law, was admitted to the bar in 1854, and in that year removed to Saint Paul, Minn., where he engaged in law practice. At the outbreak of the Civil War in 1861 he was adjutant-general and quartermaster-general of Minnesota and assisted in the organization of the troops sent to the front. In 1862 he went to the front with the rank of colonel. He commanded a brigade at Iuka, was engaged at Corinth, Port Gibson, Raymond, Jackson, Champion Hills, and at the siege and assault of Vicksburg. He had been commissioned brigadier-general of volunteers in 1863, and in October 1864 took command of the district of southwest Missouri. He bore the unique record of never having been defeated in action and with the exception of the assault of Vicksburg, never failed of complete success. He conducted a campaign against the Indians in 1865, amicably adjusted the Indian difficulties the next year, and in 1867–68 was a member of the Indian Peace Commission. He served in the Minnesota legislature for several terms.

SANBORN, Katherine Abbott ("KATE SANBORN"), American author and lecturer: b. Hanover, N. H., 11 July 1839; d. 9 July 1917. She earned her first money by writing, at the age of 11, and at 17 engaged in teaching. She lectured on literary topics for 20 years, was teacher of elocution at Packer Institute, Brooklyn, and for several years occupied the chair of English literature at Smith College. She published 'Home Pictures of English Poets' (1869); 'Round Table Series of Literature Lessons' (1884); 'The Vanity and Insanity of Genius' (1885); 'Adopting an Abandoned Farm'; 'Abandoning an Adopted Farm'; 'The Wit of Women'; 'My Literary Zoo'; 'Oldtime Wall Papers' (1905); 'Hunting Indians in a Taxi Cab' (1911); a series of calendars, etc.

SANBORN, Walter Henry, American justice: b. Epsom, N. H., 19 Oct. 1845. He was graduated at Dartmouth College in 1867, studied law, and in 1870 engaged in law practice at Saint Paul, Minn. From 1892 he was United States circuit justice of the Eighth Judicial Circuit, and from 1903 he was presiding justice of the United States Circuit Court of Appeals of the Eighth District. He conducted the receiverships of the Union Pacific Railroad, 1893–98; the Chicago Great Western, 1908–09; and the Frisco Railroad, 1913–14. He also handed down important decisions in the Trans-Missouri Freight Association Case, 1893; the Standard Oil Case, 1909; and the Oklahoma Gas Case, 1911.

SANCHO, an instrument of the guitar species, made of hollowed wood and furnished with a long neck. It is strung with the tough fibres of a creeping plant, and is tuned by means of sliding rings.

SANCHO PANZA, săn'kō păn'za (Sp. săn'chō pän'tha), the faithful squire of Don Quixote (q.v.), who accompanies his master upon his travels, but who takes a prosaic view of the incidents colored and distorted by his master's illusions. He is famous for his shrewd proverbs.

SANCHUNIATHON, săn-kū-nī'a-thŏn, or **SANCHONIATHON,** alleged author of a history of Phœnicia and Egypt, entitled 'Phoinikika,' and published by Philo (q.v.) of Byblus, a grammarian of the 2d century, as a Greek translation from the Phœnician. According to Philo, Sanchuniathon was a native of Berytus, a Phœnician town near his own native place, and flourished during the reign of the Assyrian queen Semiramis. Others speak of him as a Phœnician living before the Trojan War. Some critics maintain that no such person ever existed, and that the work attributed to him was the composition of Philo himself, or, as others think, of Eusebius. A fragment of the work is preserved in Eusebius, who quoted Sanchuniathon as evidence in corroboration of certain biblical statements which Porphyry had assailed. The Greek fragments still extant were published by Orelli (1826) and by C. Müller (1849), and were the occasion of much keen controversy. The conclusion arrived at by Renan is that a Phœnician of the time of the Seleucides, whose real or feigned name was Sanchionathon, wrote in Phœnician, a work on history and mythology, and that a free translation of this was afterward made by Philo of Byblus.

SANCROFT, săng'krŏft, **William,** English prelate: b. Fressingfield, Suffolk, 30 Jan. 1616; d. there, 24 Nov. 1693. He was graduated from Cambridge in 1637, was appointed dean of York in 1664, took orders in the English Church, and shortly afterward became dean of Saint Paul's Cathedral. In 1678 he was consecrated archbishop of Canterbury, but in 1688 on refusing to publish the declaration of the liberty of conscience ordered by James II, was committed to the Tower for trial. He was acquitted, but after the Revolution refused to take the oath of allegiance to William and Mary, was deprived of his see, thereafter living in seclusion in his native town until his death.

SANCTI SPIRITUS, sănk'tē spē'rē-toos, Cuba, city, province of Santa Clara, 50 miles southeast of the city of Santa Clara. It was founded in 1514, being one of the seven original towns of the island established by Diego Velasquez. It is connected by a branch road with Las Tunas, on the south coast, and with the main railroad system of the island; but has little commercial importance. Its situation is unhealthful; its streets are narrow and crooked, but were improved somewhat during American occupation of Cuba, nine streets being completely remade. It contains two hospitals and a college. Pop. (1907) 36,572.

SANCTIFICATION, a theological term in the definition of which divines Protestant and Catholic differ widely. For the former, sanctification is totally distinct and separable from justification: for Catholic theologians, sanctification and justification are inseparable and hardly even in thought distinguishable one from the other. Calvin (Inst. Book 3, ch. ii) the Lutheran symbol 'Solida Declaratio' (ch. *de fide justif.* § 7), and Luther and Melanchthon in many places teach that justification is simply a judicial act of God's free grace liberating the sinner from *condemnation*, while original sin still persists in man's nature and in all his powers inward and outward, to be weakened, not extirpated, by the communication of the Holy Spirit: thus sanctification is a process which begins after justification. Justification in the teaching of the Catholic Church is defined by the Council of Trent (Sess. 6, ch. vii) to be "not only remission of sins but also *sanctification* and renovation of the inner man through the free acceptance of grace and gifts"; and in another place (Sess. 6, ch. v) the Council teaches that "justification is a transference out of that state in which man is born a son of Adam, into the state of grace and adoption of the children of God, by the Second Adam, Jesus Christ our Saviour." From which it appears that in Catholic theology sanctification is inseparable from justification, which depends upon it; and that "the sinner is justified and sanctified by the one same act"; *uno eodemque act huomo peccator justus sanctusque efficitur* (Perrone, 'Praelect Theol.,' tr. *de Gratia*, Pt. 2, ch. i).

SANCTUARY, Privilege of, the exemption of certain places and of criminals taking refuge in them from the ordinary operation of the law of arrest; called also privilege of asylum (q.v.). The six cities of refuge mentioned in the Book of Numbers xxxv, were to afford the privilege of sanctuary to "any one that killeth any person unawares." That institution in Israel and the institution of asylum among the heathen nations gave rise to the similar institution of sanctuary in Christendom. The privilege of sanctuary was accorded to certain churches in the time of Constantine; afterward, through the period of the empire, eastern and western, and throughout the Middle Ages, it was recognized as attaching to all churches. In England a person accused of felony might take refuge in a sanctuary, and then before the coroner, within 40 days, take oath of abjuration entailing perpetual banishment into a foreign Christian country. Statutes of the time of Henry VIII greatly curtailed the privilege of sanctuary, and the statute of 21 James I totally abolished it. But the privilege of sanctuary against civil process still persisted, attaching to certain places, parts or supposed parts of royal palaces, as Whitefriars ("Alsatia"), the Savoy, and the Mint: these were secure refuges for debtors till 1697, when their privilege was abolished by the statute 8 and 9 William III. All religious sanctuaries in Scotland were done away at the Reformation; but the Abbey and Palace of Holy Rood with its precincts, including the hill of Arthur's Seat and the Queen's Park still afforded protection against civil process for debt; and the privilege still exists in form, though in fact it never has to be invoked since the abolition in 1880 of imprisonment for debt. It was the abuses to which this system gave rise, as tending to defeat the ends of justice, that led to its abolition in all Christian countries. A modern form of the system is extraterritoriality (q.v.).

SANCTUS, or **TERSANCTUS,** a passage in the liturgical service of the Catholic Church, eastern and western, and in part still retained in the Anglican Book of Common Prayer: it is the final passage of that part of the liturgy (and of the Anglican communion service) which is called the Preface. The name Sanctus or Tersanctus (thrice holy) is given to it because of the word sanctus (holy) thrice repeated, with which it opens. *Sanctus, sanctus, sanctus, Dominus Deus Sabaoth,* etc., that is, "Holy, holy, holy, Lord God of Hosts, heaven and earth are full of Thy glory. Hosanna in the highest. Blessed He that cometh in the name of the Lord. Hosanna in the highest." In the prayer book only the first clause is used, followed by "Glory be to Thee, O Lord Most High. Amen."

SAND, sănd, **George,** assumed name of Lucile-Amandine-Aurore Dupin, French novelist: b. Paris, 1 July 1804; d. Nohant, in Berry, 8 June 1876. Her father's mother was an illegitimate daughter of the noted Maurice de Saxe, son of Augustus II, king of Poland, and was herself widow of the Comte de Horn, bastard of Louis XV, when she married George Sand's grandfather, Dupin de Francueil. George Sand's aristocratic, though clouded, paternal ancestry was mated with plebeian blood, her mother being a Parisian *modiste*. She was brought up chiefly in the country at her grandmother's home in Nohant, but was partly educated at the Couvent des Anglaises in Paris. Her youth was dreamy and emotional. At 18 she was married to the Baron Casimir Dudevant, but the marriage proved unhappy, and resulted, after some years, in a separation. In 1831 she began a Bohemian career in Paris, associating with young literary men and students and herself often wearing masculine costume. The first important one of her many *liaisons*, so often with younger men, was with Jules Sandeau. They wrote at first under the name of Jules Sand, but soon she composed her own novels, signing them George Sand. Her first independent book was 'Indiana' (1832). George Sand's extraordinarily numerous novels are usually divided into four chronological groups. The earliest ones, in particular, which reflect her emotional discipleship of Rousseau and of the Madame de Staël of 'Delphine' and of 'Corinne,' as well as her own domestic infelicities, aroused a storm of criticism. Her hostility to accepted social conventions, her attacks on the tyranny of marriage, her portrayal of the misunderstood and unappreciated woman or *femme incomprise*, aroused the tumult of indignation which greeted 'Valentine,' 'Lélia' and 'Jacques' as expressions of over-emancipated feminism. In 1833, before the appearance of 'Jacques,' began the madly romantic love-affair with Alfred de Musset, six years her junior, and already a noted poet. Together they went to Italy, but within a few weeks, by the time of their arrival in Venice, dissension had begun. This was accentuated by the successive illnesses of George Sand and of Musset and his jealousy of the handsome young Italian doctor, Pietro Pagello, who was called in to treat him. Musset tried first a rôle of magnanimous forgiveness and returned to France, leaving George Sand with Pagello. She, however, soon repented of the change and, after stormy efforts at a renewal of the old intimacy, the final break between George Sand and Musset came in 1835. As a result of romantic literary "exhibitionism" this affair was the source of much material, Musset's 'Confession d'un enfant du siècle' and many of his finest poems, George Sand's 'Elle et lui,' not to mention documents by relatives or partisans of one or the other principal. Roughly speaking, George Sand's second literary period now begins. She discards somewhat the portrayal in her novels of beautiful men and women with obstreperous souls, and comes under the influence of people like the musician Chopin, or advocates of social reform and humanitarianism such as Michel (de Bourges), Lamennais and Pierre Leroux. Down to about the middle of the 19th century her novels, while still touched with romantic passion, tend to present in sentimental and somewhat fantastic fiction plans for the reconstruction of society and mating of classes, or visions of a world happily organized in justice and sympathy. 'Mauprat' has the excellence of a well-told story, but more characteristic works of this period are 'Spiridion,' 'Les Sept cordes de la lyre,' 'Consuelo,' 'La Comtesse de Rudolstadt,' 'Le Meunier d'Augibault' and 'Le Péché de monsieur Antoine.' In 1838–39 she made a journey to Majorca with the consumptive Chopin, a trip commemorated in 'Un hiver à Majorque.' The intimacy continued for several years longer and Chopin appears in disguise in 'Lucrezia Floriani.' At the beginning of the republic of 1848, George Sand greeted the new régime with joy, wrote 'Lettres au peuple,' collaborated with Ledru-Rollin, but soon became disheartened at popular excesses and ceased her political propaganda. Meanwhile she had gradually turned to the composition of novels of a third category. As early as 1844 in 'Jeanne' she had tried to combine the mystical spirit with a story of rustic life; then devoting herself to the idealized portrayal of the country, especially of her own province, she composed the pastoral idylls which are her works most read to-day 'La mare au diable,' 'La petite Fadette,' 'François le champi,' 'Les maîtres sonneurs.' 'Les beaux messieurs de Bois-Doré' is an incursion into the literary pastoral under the influence of Honoré d'Urfé's 'Astrée.' Finally, during the last period, beginning about 1860, she wrote sentimental stories, but of a more conventional character and free from the impractical utopianism

or even impossible fantasy which had characterized many of her earlier works. To this class belong 'Jean de la Roche' and 'Le Marquis de Villemer.' This last work won even greater success when dramatized with the help of the younger Dumas who gave it a wit and vigor which the diffuseness of George Sand herself could never achieve. Her style was, indeed, extremely diffuse. Her facility of composition was extraordinary and her plots came as she put pen to paper. She could write or stop writing at any hour of the day or night. Thus we can understand the abundance of her works, of which only a few can here be mentioned. Her influence has passed away, and she has long ceased to be thought of as revolutionary, but her books will always be remembered as both the reflection and inspiration of utopian visions of her age, and her intimacies with so many famous men give an interest to her in addition to her own merits. Her 'Histoire de ma vie' of 1855 is of interest in this respect and of much psychological value. See ELLE ET LUI.

Bibliography.— George Sand's collected works were issued as 'Romans et nouvelles' (84 vols.); 'Memoires, Souvenirs, Impressions, Voyages' (8 vols.); 'Théâtre' (4 vols.); 'Théâtre' de Nohant' (1 vol., Paris 1862–83). A uniform edition of her writings was issued in America (20 vols., Philadelphia 1901). For the incident of the Venetian doctor, Pagello, consult Cabanès, 'Cabinet secret de l'histoire' (Paris 1897), and Maurras, C., 'Les amants de Venise' (ib. 1904). Consult also Caro, E. M., 'A Life and Study of George Sand' (London 1888); Buis, Lucien, 'Les théories sociales de George Sand' (Paris 1910); Doumic, René, 'George Sand: Some Aspects of Her Life and Work' (English trans. by Alys Hallard, New York 1910); Karénine, W., 'Life of George Sand' (3 vols., 1899–1912).

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SAND, a mass of unconsolidated mineral grains of practically uniform size, large enough to be detected with the unaided eye, but too small for the grains to be readily picked up by hand. In composition sand varies greatly, from grains of pure silica or pure calcium carbonate to a complex mixture of many minerals. Pure silicious sand is in most cases primarily derived from the disintegration of igneous or other rocks, containing silica, which remains behind after the removal of other minerals more subject to chemical disintegration. The separation is usually accomplished by the waves of the seashore, and in general it may be said that the longer the sands are subject to wave activity the more complete will be the sorting process. Calcareous sands result mostly from the grinding up by the waves of shells, corals, etc., or of limestone beds; and may be of all degrees of purity. The so-called eolian limestone of the Bermudas consists of calcareous shell sand which has drifted into great dunes, and later been consolidated. Drifting dunes of gypsum are known in New Mexico. Granite, when broken down by mechanical agencies, forms a quartz-feldspar sand known as feldspathic sand, or arkose sand. Basic rocks, similarly disintegrated, form ferro-magnesian or gray wacke sand. On the shore, the sands are kept firm by the water held between the grains by capillary attraction. If this evaporates, the sands are driven inland by the winds, piled up into sand-dunes and often convert extensive districts into sand-deserts. (See DESERT). River sands derived from crystalline or metamorphic rocks often carry gold or other precious metals in the forms of grains or nuggets. Auriferous sand constitutes the source of much gold, in placer deposits. Sands washed by temporary streams from glaciers or glacial moraines and deposited in front of the ice, build up sand-plains, which are the chief source of sands and gravels in glaciated regions. (See GLACIAL DEPOSITS). The ordinary grades of sand are much used in the building trades for mortar and concrete; very pure quartz sand is largely used in glass manufacture; and various other grades of sand are employed for a very large number of purposes. See MINERAL PRODUCTION OF THE UNITED STATES.

SAND, Musical. See MUSICAL SAND.

SAND-BADGER, or **HOG-BADGER,** a small East Indian badger (*Arctonyx collaris*), which gets its first name from its customary station and burrowing habits, and the second from its pig-like rooting snout. Another frequently heard name is «balisaur.» It frequents stony ground and occupies natural crevices and dens when these are handy, but elsewhere digs rapidly and deeply burrows in which it spends its days for the most part, waiting until night to go abroad in search of its small prey. Its general habits are like those of its type. See BADGER.

SAND-BLAST, an invention for the use of sand as a blast in cutting and engraving glass, stone, metals, etc. The sand is blown against the article to be cut by a blast of air or steam, which quickly cuts away the unprotected surface, leaving in relief that part of the surface guarded from the effect of the sand by patterns of iron or other substance harder than that which it is desired to efface. The sand-blast is much used to clean the exterior of stone buildings, and it has been used largely in the preparation of soldiers' tombstones, and other large contracts of a similar character.

SAND-BUR, either of two very dissimilar plants. One, also called the buffalo-bur (*Solanum rostratum*), is a weed, native to the western plains of the United States; it is the original food of the potato-bug, and is working eastward, its seeds having traveled at first, perhaps, in the coats of the bison. It has even crossed to Europe, by some means. The sand-bur is an annual, densely pubescent and prickle-armed plant, having the characteristic star-shaped flowers of the potato, although yellow in hue. The calyx is densely prickly, and surrounds the berry in fruit, the prickles becoming as long as the berry itself. Sand-bur seeds occur among fodder-seeds grown in the West, but careful cultivation will subdue this weed. The plant is light and bushy, and is blown over the prairies as a tumble weed.

A grass (*Enchrus tribuloides*) is also called «sand-bur,» and is commonly found near seashores or in waste land, in the eastern half of the United States, where it is becoming a noxious weed in some places. It has robust stems,

partly decumbent from an annual root, and branches freely. The leaves are flat, and the floral involucres are crowded in terminal spikes on a rough stem, and form spiny burs, which stick easily to clothing or the hair of animals, and so may be carried long distances.

SAND-CAKE, or **SAND-DOLLAR,** a name along the New England coast for one of the flat, dollar-shaped, villose sea-urchins of the genus *Echinarachnius;* several species are to be found on sandy bottom near shore and others are numerous in greater depths, affording some food to cod, flounders and other bottom-feeding fishes. See CAKE-URCHIN.

SAND-CRACK, a crack or fissure in the hoof of a horse, due to a disease generally referred to the coronet, sometimes to the laminæ covering the pedal bone, specifically to the membrane which secretes an essential adhesive substance entering into the constitution of the hoof. The crack generally extends from the coronet toward the sole. In the fore feet the inner quarters are most frequently attacked; in the hind feet, the toes. There are various forms of sand-crack, the most common of them being usually called quarter-crack. See HOOF.

SAND CREEK MASSACRE, a sanguinary attack by Colonel Chivington on 29 Nov. 1864, on a Cheyenne and Arapaho camp in Kiowa County, Colo. The Indian Commissioner had sent about 400 Indians of the tribes above named to a camp at Sand Creek. The military desired to cow the Indians by heavy punishment for their atrocities against the whites, while the Indian Department earnestly sought to mediate between the white settlers, the military and the aborigines. Chivington slaughtered 131 men, women and children, and a long and costly struggle ensued. Not until 1871 did the Cheyenne put aside the sword and consent to go on a reservation.

SAND-DARTER, a genus (*Ammocrypta*) of small fresh-water fishes (see DARTER), whose species, especially *A. pellucida,* common in the mid-continent streams, buries itself in the sandy bottom with astonishing quickness and completeness.

SAND DUNE. See DUNE.

SAND-GROUSE, a family (*Pteroclidæ*) of birds related, on the one hand, to the pigeons (*Columbæ*), and, on the other, to the grouse (*Gallinæ*). The sand-grouse inhabit the plains and sandy deserts of the tropical regions and countries of the eastern hemisphere. The legs are longer than in grouse, the tail and wings pointed and the general aspect dove-like. The best-known species are the *Pterocles alchata* and the *P. arenaria.* Both of these birds occur in southern Europe. They fly well and feed upon seeds and insects. The eggs are four or five in number and the nest is constructed in a rough fashion on the ground. Other species inhabit Asia and Africa. Pallas' sand-grouse has been made the type of a different genus, *Syrrhaptes,* in which the tarsi are feathered and the anterior toes united in a common integument, as well as feathered to the claws, the hallux absent. It is a native of the plains of central Asia, where it occurs in vast numbers. Much interest was excited in 1863 and again in 1888 by great numbers of these birds invading Europe. They crossed the North Sea and were found in considerable numbers throughout Britain, and as far north as the Faroes. They even bred in Great Britain in one or two cases. Smaller invasions occurred in other years. Sand-grouse are classed as game-birds in the regions in which they occur and especially in India.

SAND-HILL CRANE. See CRANE.

SAND-HOPPER. See AMPHIPODA.

SAND-LAUNCE, or **SAND-EEL,** a small teleost fish of the family *Ammodytidæ,* which is represented on all the colder coasts of the world by some 10 species, but whose relationships are undetermined. They have the shape of eels, from 6 to 12 inches long, according to species, but are distinguished by the fact that the tail-fin is well developed and is distinct from the dorsal and anal fins, while it is also forked at its extremity. The skin is silvery in appearance, but destitute of true scales. The lateral line runs along the side of the back. The dorsal fin begins just behind the head and extends nearly to the caudal fin. The anal fin extends to about one-third or one-half the length of the body. Several species are to be found on both coasts of North America.

SAND-MARTIN. See BANK-SWALLOW.

SAND-PAPER, an abrading agent made by coating paper or thin cotton cloth with glue and dusting fine sand over it with a sieve. Sand-paper is intermediate between glass paper and emery paper in its action on metals, but is less energetic than glass paper in its action on wood.

SAND-PIKE, a fish, the sauger (q.v.).

SAND PIPE, cylindrical hollows, often of great depth and filled with sand and gravel. They are characteristic of all rocks, but have been particularly described from the white chalk of England and France, where Lyell has found them up to 12 feet in diameter and over 60 feet deep. They are analogous to pot-holes formed along mountain streams through the gyrating motion of the water in an eddy. The holes are cut by loose rocks kept in constant circular motion by the water. Analogous hollows, termed glacial pot-holes or moulins, are also found where a superglacial or englacial stream plunges down a crevasse and sets the rocks at the bottom of the crevasse in motion, thus often cutting to great depths. These holes or pipes are afterward filled with sand and gravel either by the stream or upon the melting of the ice. These holes have also been attributed by Lyell to the chemical action of water charged with carbonic acid gas, which was derived from the decaying vegetation of the soil through which the water passed.

Similar deposits of sand, generally solidified into sandstones or quartzites, are not infrequently found in the older rocks of all countries. These are generally masses in the form of dikes penetrating sedimentary or crystalline rocks, often to a great depth. Many of these sandstone dikes were formed at a very early period in the earth's history, when the fissures were formed either through solution, atmospheric disintegration or in some cases through earthquake shocks.

SAND-SHARK, a small voracious shark of the family *Carchariidæ,* which is mainly ex-

tinct, the three existing species occurring chiefly in the Atlantic, where *Carcharias littoralis* (J. and E.) occurs numerously on the American coast between Cape Cod and Cape Hatteras; it is doubtfully different from the one frequently seen along the European coast. These sharks are similar to the mackerel sharks (*Lamnidæ*) and reach a length of five or six feet.

SAND-SUCKER, a local name in California for a familiar fish, the whiting (q.v.).

SAND-WASP, any of many solitary wasps which burrow in sand or loose earth and leave their eggs there in well-provisioned cells. There are numerous species in all parts of the world. See WASP.

SAND WHEEL. The removal of fine waste, sand and slime from mills where ores are crushed and concentrated may call for the use of special devices, one of which is the sand wheel. If the mill stands on a hillside such refuse can usually be washed down troughs, called launders, to lower ground where it may accumulate. If the mill site is level land and the mill handles a large amount of rock then the refuse must be lifted that it may flow to a settling place. Various types of elevators and conveyors are used for this purpose. The sand wheel, though bulky, has the merits of simplicity and few wearing parts, and is simply a development of the water wheels used since ancient times for irrigation purposes in Eastern countries. At ore mills in many parts of the world sand wheels may be seen, notably at the great gold mines of the Transvaal, where are some over 50 feet in diameter.

A giant sand wheel, one of the largest ever erected, handles the mingled sand and water from the great crushing and concentrating plant of the Calumet and Hecla Mining Company at Lake Linden, Mich. This mill treats an enormous tonnage of copper-bearing rock and the resulting waste is run into the lake where the accumulations of years cover many acres. The large wheel was erected that the waste might be lifted higher to flow over the old deposits. It is 65 feet in diameter, elevates the water and waste to a height of 50 feet and has a capacity of 75,000,000 gallons in 24 hours.

It was constructed by the Robert Pool and Son Company of Baltimore, Md. In the general principles of design involved the wheel does not differ materially from other segmental iron and steel wheels of large diameter, but is of interest from its size. The axle, a hollow cylinder made of Krupp's crucible cast steel, was forged at Essen, Germany, but finished at Baltimore; it is 27 feet long, 32 inches in diameter at the middle and has a 16-inch hole through the centre. This axle weighs 42,000 pounds.

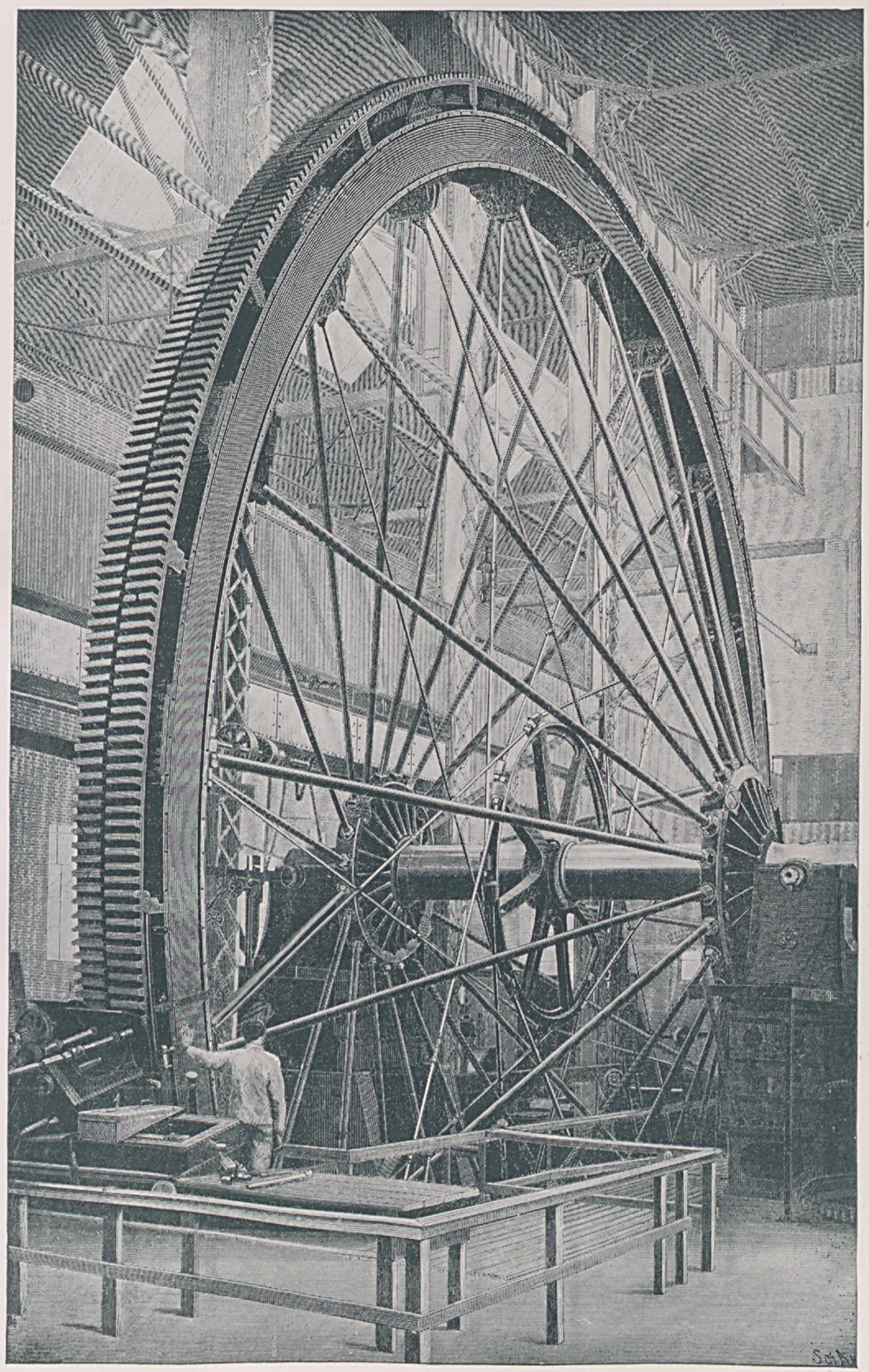
The axle journals are 25 inches in diameter and 42 inches long. Fitted to either end of the axle is a massive gun-iron hub, weighing 20,000 pounds, and from these hubs radiate 40 four-inch steel rods or spokes to the inner face of the rim. The inner end of each spoke is fitted with a thread, nut and lock-nut by which the requisite tension is given for securing and truing the rim. The outer end of each rod is turned into an eye and fastened to a steel flange on the rim by an eyebolt. The rim is built up in 20 segments. It consists of two concentric rings, an inner or main ring of box-shaped cross section to which the spokes are attached, and an outer or toothed ring fastened through inwardly projecting flanges to the inner rim by bolts and keys. On the periphery of this outer rim are gear teeth, accurately milled in two rows, staggered. Each row of teeth is 12 inches wide, making the effective width 24 inches. And there are 26 teeth in each segment or 520 in all.

To each side of the sectional rim is riveted a triangular plate iron box, carrying on its inner side 275 buckets, making 550 in all, each bucket measuring 4 feet 3½ inches, by 3 feet 4 inches. The wheel makes about four revolutions per minute and the peripheral speed of the buckets is about 12 feet per second, but the buckets are set at such an angle that the peripheral speed prevents their discharge till they are near the top of the wheel. The tangential strains due to the loads of sand in the buckets are taken up by a system of tangent tie-rods which extend from the lugs, already referred to, on the rim, to the periphery of a tangent hub which is keyed to the centre of the axle, between the two outer hubs. These tie-rods are arranged in pairs and in opposite directions so that, although the load at the periphery may exert either a right-handed or a left-handed strain, no transverse bending strain is brought upon the main spokes of the wheel. The tension of the tangential tie-rods is adjusted by means of turnbuckles placed at the centre of each rod. The wheel, with buckets attached, is nearly 12 feet wide across the face. It is driven by an electric motor of 750 horse power through a pinion wheel 37 inches in diameter having a shaft carrying a wheel that engages a pinion on the motor shaft. The wheel dips into a pit 100 feet long, 12 feet wide and 30 feet deep that receives the sand and water. From this pit the refuse is scooped up and discharged into a launder at an elevation of about 50 feet. For protection against the elements, the winter climate being severe, the wheel is housed in a building high enough to cover it entirely.

SANDAL, a kind of covering for the feet used among the ancient Jews, Greeks and Romans and which we find to be of the highest antiquity. It usually consisted of leather or of a thick cork sole covered above and beneath with leather and neatly stitched on the edge. It left the upper part of the foot bare and was fastened on by means of straps, crossed over and wound round the ankle. In later times sandals became articles of much luxury, being made of gold, silver or other precious material and beautifully ornamented. See BOOTS AND SHOES.

SANDAL-WOOD, a fragrant wood furnished by the genera *Santalum* and *Fusanus*, of the family *Santalaceæ*. The principal source of the genuine sandal-wood is a small evergreen tree (*Santalum album*), partly parasitic in growth, with opposite entire leaves and thyrses of yellowish flowers which resemble those of the privet. It grows wild and is now also cultivated in the dry regions of southern India and on the mountains of the Malay Archipelago.

The trees are mature in about 20 years and are then cut down, the trunk being then about a foot in diameter. The felled trunks are left on the ground in order that the white ants may eat off the useless sapwood, the insects



GIANT SAND WHEEL FOR THE CALUMET AND HECLA MINING COMPANY

Diameter, 65 feet; Weight, 50 tons; Number of buckets, 550

leaving the aromatic heart wood untouched. When thus cleaned the sandal-wood is sawn into small pieces and then dried slowly to improve the fragrance and to prevent splitting. This heart wood is yellowish-brown, very hard and close-grained and made odorous by the presence of an oil, which is still more abundant in the root. The oil is distilled from the roots and chips and is largely used as a perfume, especially in India, and also as a medicine; it is said to have replaced copaiba in the treatment of diseases of the mucous membrane. The heart wood is used especially by the Chinese for carvings, fans, boxes, etc., not only because of its lasting perfume, but because it repels insects; it was employed in India during the 5th century at least and is still a necessary article in various Buddhistic ceremonies, in cremations, for caste marks and for incense. It was probably one of the ingredients of the Levitical incense and the almug of Scripture. Sandal-wood was originally obtained only in India, but other species (*S. freycinetianum* and *S. pyrularium*) were found in Hawaii and in other Pacific islands and led to a trade so high-handed that many deaths ensued and the supply of trees was nearly exhausted.

A small leguminous tree (*Pterocarpus santalinus*) furnishes the red sandal- or saunders-wood, having a heart wood, first dark-red, but becoming brownish on exposure, and used as a dyestuff, giving reddish-brown hues to woolens. Powdered it was employed to color foods and was considered by Hindu physicians to be astringent and tonic. Various inferior qualities of sandal-wood are obtained from *Bucida capitata*, the *Myoporaceæ* and other trees.

SANDARACH, a friable, dry, almost transparent resin, which is imported from Morocco, in pale yellow tears, somewhat harder than mastic. It exudes from the bark of the small coniferous sandarach-tree, also called the tear tree (*Callitris quadrivalvis*), a native of the north of Africa and a characteristic tree of the Atlas Mountains. The Australian species of *Callitris* furnish a similar resin. Sandarach is not used in great quantity. Although a medicine in high repute at one time and later used for a pounce-powder, to prevent ink from spreading when writing over an erasure, its chief employment now is in the making of varnishes, the same as mastic. The mahogany-colored wood of the sandarach tree is highly balsamic, extremely durable and is utilized by cabinet-makers and mosque-builders; it is said to have brought fabulous prices in Pliny's time.

SANDAY, William, English Biblical scholar: b. Holme-Pierrepont, Nottinghamshire, 1 Aug. 1843. He was educated at Oxford, took orders in the Anglican Church and has been Lady Margaret professor of divinity and canon of Christ Church, Oxford, from 1895. He is the author of 'The Authorship and Historical Characters of the Fourth Gospel' (1872); 'The Gospels in the 2d Century' (1876); 'Inspiration' (1893–96); 'The Catholic Movement and the Archbishops' Decision' (1899), etc.

SANDBAGS, in fortification and other military operations, are coarse canvas bags, about 30 inches long and 15 inches thick, filled with sand, and much used in cases where cover for troops is required to be speedily obtained.

SANDBURG, Carl, American author: b. Galesburg, Ill., 6 Jan. 1878. In 1898–1902 he studied at Lombard College, Galesburg, and in 1910–12 was secretary to the mayor of Milwaukee, Wis. He became associate editor of *System Magazine* in 1913 and was also editorial writer on the Chicago *Daily News*. Mr. Sandburg was awarded the Levinson prize in the *Poetry Magazine* in 1914. He served in Company C, 6th Illinois Volunteers, in 1898 and saw active service in Porto Rico. In 1918 he was a member of the editorial board of the National Labor Defense Council.

SANDBY, Paul, English painter: b. Nottingham, 1725; d. London, 9 Nov. 1809. He was one of the earliest painters in water colors in England, and has been styled "the father of the water color school," but began life as a teacher of boys and only resolved on an artistic career after his appointment to the staff of the military drawing department of the Tower of London (1741). In 1747 he was draughtsman for the government survey of the Highlands of Scotland, which gave him a good opportunity for sketching to scenery. In 1752 he made 70 drawings of Windsor Castle and Eton, and afterward accompanied Sir Joseph Banks on a tour of Wales. In 1768 he was appointed drawing-master at Woolwich Academy, and became one of the most fashionable art teachers of his day. His 'Views of the Encampment in the Parks' (1780) illustrate his style. He outlined his subjects with a pen and then washed them in with colors in a very simple and direct way. His best works are those in body colors, which are tinted with richness, depth and refinement and are not conventionalized by the bold pen outline. As a caricaturist, he is known by his ridicule of Hogarth's 'Line of Beauty,' and his caricature portraits, such as those of 'Lords North and Thurlow.' He was a member of the Incorporated Society of Artists, and one of the original members of the Royal Academy, founded 1768.

SANDEMAN, sän'dē-man, **Robert,** Scottish religious leader: b. Perth, Scotland, 1723; d. Danbury, Conn., 1771. He studied at Edinburgh and afterward engaged in the linen trade. On marrying the daughter of the Rev. John Glass (founder of the Glassites), he adopted his pastor's views in opposition to all church establishments and became an elder in his congregation. He soon after published a series of letters, in which he endeavors to show that a justifying faith means nothing more than a simple assent to the divine mission of Christ. Sandeman went to London in 1760 and managed to gather together a congregation of his own followers, who were called Sandemanians. The Glassites or Sandemanians number at present less than 2,000 throughout the world. In 1764 Sandeman accepted an invitation to New England, and became the author of some theological tracts, letters, discourses, etc., besides his 'Letters on Theron and Aspasio.' The Sandemanians revived the love-feast (to take place in each other's houses); the kiss of peace; the support of the poor members by the community; washing each other's feet; community of goods; they maintained the unlawfulness of saving money, etc. They still have a slender following at Danbury, Conn. The most noted personage professing the Sandemanian faith

was the great scientist, Michael Faraday (q.v.), who lived and died in that communion.

SANDEMANIANS. See SANDEMAN, ROBERT; RELIGIOUS SECTS.

SANDERLING, a sandpiper (*Calidris arenaria*), peculiar in lacking the hind toe. This bird averages seven to eight inches in length, and is colored in winter, gray on the upper and white on the under parts; the spring plumage differs in exhibiting reddish tints, marked with black. It is nearly cosmopolitan, breeding in the Arctic regions of both hemispheres, and migrating to the southern parts of South America and Africa, though many winter in the Southern States. The food consists of worms, crustacea, etc. These birds chiefly inhabit the sandy tracts of the sea-beach, and the estuaries of rivers, but are common about large bodies of water in the interior also, and associate with other species. The flesh is nutritious and pleasant to the taste, and the bird is a favorite with gunners in quest of shore-birds.

SANDERS, săn'dẽrz, **Frank Knight,** American Biblical scholar: b. Batticotta, Jaffna, Ceylon, 5 June 1861. He was graduated from Ripon College, Wisconsin, in 1882, was instructor at Jaffna College, 1882–86, and studied Semitic languages at Yale 1886–87. He was Woolsey professor of Biblical literature at Yale 1893–1901; held the chair of Biblical history and archæology and became dean of Yale Divinity School, 1901–05; was secretary of the Congregational Sunday School and Publication Society 1905–08; president of Washburn College, Kansas, 1908–14; and from 1914 director of the Board of Missionary Preparation. He has published with C. F. Kent 'The Messages of the Bible' (12 vols., 1897–1912) and is author of 'The Teachers' Life of Christ' (1907); 'Studies in the Life of Paul' (1908); 'The Messages of the Sages' (1915); 'History of the Hebrews' (1914), etc.

SANDERS, Henry Arthur, American classical scholar: b. Livermore, Me., 1868. He was educated at the universities of Michigan, Berlin and Munich. He was connected with the faculty of the University of Michigan in 1893–95, and continuously after 1899, becoming professor of Latin there in 1911. In 1915–16 he was on leave of absence and served as acting director of the School of Classical Studies of the American Academy at Rome, Italy. He is a contributor to various philological, archæological and educational journals; edited 'Roman History and Mythology' (1910); and is author of 'Roman Historical Scenes and Institutions' (1904); 'The New Testament Manuscript in the Freer Collection' (1912); 'The Old Testament Manuscript in the Freer Collection' (1917); 'Washington Manuscript of the Psalms' (1917), etc.

SANDERS, Liman von, German general and field-marshal: b. (?). "Liman Pasha" was sent to Turkey in 1913 as head of a military mission to reorganize the Turkish army, assisted by Marshal von der Goltz. In May 1914 he issued from Constantinople sealed orders for mobilization to be delivered to every mayor and village president, and to be opened only on telegraphic notice from the war office. These orders were unsealed on 3 August. Early in 1915 he is said to have been the chief instrument in hindering the actions of the Turkish peace party's plans. He personally conducted the defense of the Dardanelles against the powerful attacks of the British navy and army, establishing his headquarters at Gallipoli, the centre of the fighting. He informed American war correspondents in October 1914 of the practical impossibility of the capture of the Gallipoli peninsula with its impregnable fortifications, which had been the work of the British covering a number of years. He was succeeded in August 1915 by the Grand Duke of Mecklenburg and was made commander-in-chief of the Turkish forces on the Caucasian front. At the British investment of Jerusalem he forsook the Turkish army and returned to Constantinople in September 1917. When the Entente and associated powers concluded an armistice with Turkey in 1918 Liman von Sanders was arrested in Constantinople and remained under detention there until August 1919 when he was repatriated.

SANDERS' RAID INTO EAST TENNESSEE. On 14 June 1863 Col. W. P. Sanders, with 1,500 mounted men and two guns, left Mount Vernon, Ky., to destroy the East Tennessee and Virginia Railroad. Crossing the Cumberland River he surprised a body of 400 Confederates at Montgomery, Tenn., on the 17th, capturing 105 officers and men and a large amount of supplies. Avoiding the Confederates at points on the way, he struck the railroad at Lenoirs on the morning of the 19th, captured three guns and about 65 prisoners, burned the depot and other buildings, containing five guns, 2,500 stand of small arms and ammunition, and then destroyed the railroad to within a short distance of Knoxville. Leaving a regiment south of the city to demonstrate on it, Sanders, with the rest of the command, passed around the place during the night, struck the railroad north of it, burned the bridges and on the morning of the 20th made a strong demonstration on Knoxville by the Tazewell road. Artillery firing and skirmishing continued an hour, during which Sanders captured two guns, 30 prisoners and some horses, and then followed the railroad to Strawberry Plains, destroying all bridges, including one over the Holston 1,600 feet long, near which, after a sharp engagement with the bridge-guard, he took 140 prisoners, five guns and a train of cars loaded with supplies. At daylight 21 June he started up the railroad for the Mossy Creek bridge, destroying the road at several points, and also the bridge. Large quantities of stores and 120 prisoners were captured. He now left the railroad to return by Rogers' Gap, avoiding forces sent to intercept him. The gap was found blocked by fallen timber and guarded by infantry and artillery, and adjoining gaps were found similarly obstructed. With the enemy in his front and closing on his rear, he found but one way to escape, and that by a trail impassable for artillery. He abandoned his guns, after destroying them and their ammunition, and by a wood road moved through Smith's Gap, three miles from Rogers', driving a cavalry regiment from it, and after a hard march in the Cumberland Mountains, in which some of his men took wrong roads, he reached Boston, Ky., on the 23d with a loss during his raid of two killed, four wounded and 13 missing. He had captured 10 guns and 10,000 small arms and paroled 461 prisoners. Consult 'Official Records' (Vol. XXIII).

SANDERSON, John, American author: b. near Carlisle, Pa., 1783; d. Philadelphia, 5 April 1844. He was professor of Latin and Greek in the Philadelphia High School from 1836 until his death. With his brother he was author of 'Biography of the Signers of the Declaration of Independence' (Vols. I–II, 1820), and was sole author of 'Sketches of Paris' (1838; London ed., 'The Americans in Paris,' 1838).

SANDERSVILLE, Ga., city, capital of Washington County, on the South Carolina and Georgia Railroad, 120 miles northwest of Savannah. It is situated between the Oconee and Ogeechee rivers, in a fertile cotton region, and has a considerable export trade in cotton. It has a high school for colored pupils established in 1890. Pop. 2,695.

SANDFORD, Frank W., American religious leader: b. Bowdoin, Me., 1862. He was educated at Bates College and at Cobb Divinity School, Lewiston, Me., and entered the ministry of the Free Baptist Church. In 1893, after some years as a pastor, he made the announcement at the convention of his denomination that he had received divine revelations. He thereupon left the Free Baptists and founded a sect known as the Holy Ghost and Us Society, a communistic organization at Durham, Me. Members are required to turn all their property over to the society, and all legal titles are vested in Sandford, the leader of the community. There are about 300 members. Their belief includes miraculous healing, the literal interpretation of the Apocalypse, Daniel and the judgment pictures in the Synoptic Gospels and the near approach of the end of the world. They insist upon baptism by immersion under their own rites.

SANDFORD AND MERTON, The History of, a famous book intended for juvenile reading by Thomas Day, published 1783–89. Portraying English social ideas of more than 100 years ago, it is now regarded as a literary curiosity. It is named for two school boys whose adventures are related in sedate fashion. Morals are drawn from every incident of their daily lives and from the stories which they read in their lesson books. Not the least remarkable feature of the book is the polished language used by these children of six years of age, which was typical of the refinement advanced English culture of the period sought to instil in youth.

SANDPIPERS, small limicoline birds of the family *Scolopacidæ*, but not clearly distinguished, either in ornithology or in common practice, from the snipes (q.v.), although attempts have been made to erect them into one or more sub-families, *Tringinæ*, etc. Most of the group collect about the typical genus *Tringa*, and as a whole the sandpipers may be said to be intermediate between the snipes and the plovers. The bill is snipe-like in its form and sensitiveness, but is much shorter, while the legs are generally longer than in the true snipes, and the tail-feathers are not cross-barred, and sandpipers are further distinguished from the snipes and allies by the well-marked seasonal changes of the plumage. From the plover the sandpipers may be at once known by the straight and slender bill and by the possession of a well-developed hind toe, with the single exception of the sanderling (q.v.), as well as by numerous other characters. The true sandpipers are all birds of small and some of diminutive size. Like most of the plovers they are, with few exceptions, gregarious and frequent the shores of sea, lake and river in large flocks, but they differ from the plovers and resemble the snipes in their mode of procuring food; they probe the soft mud with their slender sensitive bills and extract from it various kinds of worms, crustaceans and larvæ. Most of the species breed in the north and perform extensive migrations. The simple nests are built on the ground and the eggs are almost invariably four and of a strong marked pyriform shape well adapted to prevent them from rolling away. The young are fully covered with down and are active as soon as freed from the egg shell. Very nearly all of the sandpipers belong to the northern hemisphere during the breeding season, and as they are especially prone to wander during the migrations, a large proportion of the Old World species have occurred as more or less regular stragglers in North America. Our fauna includes about 25 species exclusive of the related phalaropes, willets, godwits, tattlers and curlews (qq.v.), all of which, except the last, are by some writers comprised within the sandpiper group.

Some of the species are treated in other parts of this work under the names knot, dunlin, robin-snipe, sanderling, etc. Among other important species are the stilt sandpiper (*Himantopus mexicanus*), which might well be classed as a snipe because of the length of the bill, which is often distinctly curved. The legs are unusually long and small webs occur between the bases of the front toes. This species is about nine inches long and the plumage is much mottled, black, white, tawny and reddish, with a general dark effect in the breeding season; but during the fall and winter grayish and ashy from the absence of black and reddish. The stilt breeds on the shores of Franklin and Hudson bays and appears in the United States in July and August, but, except in Florida, is rare. It winters as far south as Argentina. The purple-sandpiper (*Tringa maritima*) has the short legs unusually well feathered and the front toes unusually long and margined, the hind toe very short. In its winter dress the plumage is characterized by the distinctly purple gloss of the dark upper parts, the lower being chiefly white. It is a circumpolar species and breeds in the far North, in Iceland, Greenland, Nova Zembla and beyond and may even winter in Arctic regions. It seldom enters the United States until December and ordinarily winters in the New England and Middle States, seeking rocky sea-shores in small parties. A few also occur about the Great Lakes and the species is nowhere abundant. A closely related species is the pectoral sandpiper (*T. maculata*), the jack-snipe, grass-snipe or krieker of gunners, the last name in imitation of its call. It is about nine inches long and is readily distinguished from the last by the deeper grooving of the bill, the naked lower half of the tibial portion of the leg and the thickly streaked breast; and from simi-

larly colored species by its large size. This species is abundant along the Atlantic Coast during August and September when the old birds, accompanied by the young of the year, are journeying from their arctic summer home to the pampas of Argentina and Patagonia. In habits this is more a snipe than a sandpiper, as it frequents the salt meadows and grassy margins of pools and seldom flocks on the sand beaches or associates with related species, though often found in the company of plovers. The spring flight northward follows the Mississippi Valley and few are found at this season along the sea-shore. The male is larger than the female and has remarkable courting habits. As he struts and crosses in front of the female his œsophagus is inflated like that of a pouter pigeon, and at the same time a deep resonant note is produced. The least sandpiper (*T. minutilla*) is in form and color an almost exact miniature of the last, being not over six inches long and the smallest of the group. It is also known as the stint of peep and is a typical sandpiper, breeding in British America and frequenting the sea-shore in large flocks along with other species in April and May and in augmented numbers again in August and September. It is, however, found inland, as well, in suitable localities throughout North America and spends the winter from our southern borders to Patagonia. A constant associate of the least sandpiper, which it resembles in distribution, habits and appearance so closely that the two are frequently confounded, is the semi-palmated sandpiper (*Ereunetes pusillus*). It may, however, be easily separated by the well-marked webbing between the front toes. Passing over the godwits, willets and yellowlegs, which form a somewhat distinct group of large species, the well-known and much appreciated Bartromian sandpiper, upland plover or grass plover (*Bartramia longicauda*) next requires notice. This species is about one foot long and approaches the tattlers in the cross-barred tail-feathers and unusually long gape which extends below the eye, while the tail is remarkably long and the grooving of the bill is absent from the terminal fourth. The sexes are alike and no seasonal changes occur. It is found in summer and breeds throughout North America, chiefly east of the Rocky Mountains, and spends the winter in upper South America. Unlike most of the group this is an upland bird, preferring dry plains and grassy fields to the vicinity of water. It arrives in early May and shortly after builds a nest of a few straws and grasses in a slight depression on the ground and lays four pyriform eggs of a clay color very thickly spotted all over with small discrete spots of brown and purplish gray. After the breeding season it leaves the meadows for cultivated fields and feeds very largely on crickets and grasshoppers, though other insects and berries are also eaten. This species flies high and swiftly and, unlike most sandpipers, will perch on fences and even trees. It has a peculiar wild cry which is heard by night as well as day. In the east the upland plover, by which name it is best known, is seen chiefly singly or in pairs and families, but in the great grass regions of Kansas and Texas, where it is very abundant, large flocks are formed. A species somewhat closely related to the upland plover in form and habit is the buff-breasted sandpiper (*Tryngites subrufficolis*) which is about eight inches long, breeds in the interior of British America and is nowhere very common during the migrations through the United States. Another related species is the well-known greenish spotted sandpiper or pee-weet (*Actitis macularia*) found everywhere throughout North America along small streams, as well as on the shores of lakes and the sea and breeding throughout its summer range. To most people it is the most familiar species of all the sandpipers and requires no description.

To the gunner most of these and other species of sandpipers are classed along with many of the plovers, yellow-legs, curlews, etc., as shore and bay birds, all of which are shot along the entire coast line during the autumn migration. These birds flock to the exposed shores to feed at ebb tide and are gregarious and attracted by their own or kindred species feeding on the beaches. The gunner places wooden decoys, cut and painted in rude imitation of the various species, at some favorable point and conceals himself behind a blind of seaweed or brush within range of his stool of decoys. As the birds pause over the latter to examine them, often in compact flocks, a single shot will often kill several, and large bags used to be secured during a single tide; but these birds have been so continuously persecuted that a dozen or two of the larger and medium sized species is now considered ample reward for a day's shooting. Species which, like the pectoral sandpiper, frequent the pools on the salt meadows are also caught by tramping or tolled within range of a blind by imitating their calls. The sport afforded by the upland plover is of a quite different and more worthy sort. These birds are extremely wary and difficult to approach and, as they do not flock in the East, may be brought within range only by a most careful approach, while their flight is so rapid as to require the best exertions of a quick and accurate shot. On the prairies of the West this same species is sometimes shot from a wagon, of which the birds are less suspicious. For the table most of the sandpipers are highly prized and few delicacies surpass a well-turned upland plover.

Bibliography.—Aflalo, 'Sport in Europe' (London 1901); Baird, Brewer and Ridgeway, 'North American Water Birds' (Boston 1884); Coues, Elliott, 'Birds of the Northwest' (Washington 1874); Elliot, D. G., 'North American Shore Birds' (New York 1898); Hudson, W. H., 'The Naturalist in La Plata' (4th ed., London 1903); Sanford, 'The Water Fowl Family' (New York 1903).

SANDPOINT, Idaho, city and county-seat of Bonner County, at the outlet of Pend d'Oreille Lake, 325 miles north of Boise and 48 miles northeast of Spokane, Wash., on the Northern Pacific, the Great Northern and the Spokane International railroads. The region is noted for its superb scenery and excellent fishing, and there are lumber industries. Pop. 2,876.

SANDRART, sänd'rärt, **Joachim von,** German artist and art critic: b. Frankfort-on-Main, 2 May 1606; d. Nuremberg, 14 Oct. 1688. He studied painting and copperplate engraving under eminent painters and engravers at Utrecht and also traveled in England where he was employed by Charles I and the Duke of Buckingham, and Italy (1627) where he became, at Rome, the intimate friend of Claude Lorraine. Among other pictures, he painted 'The Death of Seneca' for the king of Spain and a 'Nightpiece' in the style of Honthorst; besides furnishing the illustrations for 'Galeria Giustiniana' (1631). He executed under commission from Urban VIII several portraits and pictures for the churches in Rome and made a number of sketches in central Italy for M. Zeiter's 'Itinerarium Italiæ' and Gottfried's 'Archontologia Cosmica.' On his return to Frankfort he painted for Maximilian I of Bavaria in the gallery at Schleissheim 'The Twelve Months' and 'Day and Night.' He subsequently inherited the estate of Stockau, near Ingolstadt, assumed a title and henceforth gave a good deal of his time to art literature, painting also some portraits of the nobility. His masterpiece is 'The Company of Archers assembled to do Honor to Maria de Medici when she visited Amsterdam,' now in the town-hall of that city. But his works on art are so important that they have almost obscured his fame as a painter. These books include 'Deutsche Akademie der edlen Bau-Bild- und Malereikünste' (1675–79; critical edition by Sponsel 1896); 'Admiranda Sculpturæ seu Statuariæ Veteris' (1689), and 'Insignium Romæ Templorum Prospectus Exteriores et Interiores.'

SANDRINGHAM, sănd'rĭng-ăm, England, in Norfolk, seven and one-half miles northeast of Lynn, is an estate comprising 7,000 acres. It was purchased in 1862 by the Prince of Wales, later Edward VII, who erected a mansion in Elizabethan style as a country residence. It is surrounded by a charming park of 200 acres. The «Norwich gates,» the dairy and the cottages are interesting features. The Germans made an aerial attack on Sandringham in January 1915.

SANDROCOTTUS, săn-drō-kŏt'ŭs, the Indian king to whom Megasthenes was sent by Seleucus Nicator, in 306, as his Ambassador. Megasthenes improved the opportunity to collect materials for his historic work in four books, 'Indica,' which is the most important work of Greek antiquity upon that subject. According to this author Sandrocottus reigned over the Gangaridæ and Prasii, nations of the Ganges Valley. After the death of Alexander he extended his dominion over the whole of northern India, subduing even the Macedonians whom Alexander had put in possession of the Indus Valley and the Punjab. Seleucus received 500 war elephants from the Indian conqueror on confirming the cession of this territory and left Megasthenes as his Ambassador at the courts of Sandrocottus. This monarch, originally a robber chieftain, may now safely be identified with Chandragupta, whose accession is celebrated in the Sanskrit drama 'Mudrarakshasa.' His capital was Pataliputra (Gk. Palibothra), modern Patna, a city situated in Bengal on the banks of the Ganges, and there he established the Mauryan dynasty. Consult Schwanbeck, 'Megasthenis Indica' (1846); Muller, 'Fragmenta Historicum Græcorum' (1841–70); McCrindle, 'Ancient India as Described by Megasthenes and Arrian' (1877).

SANDS, Benjamin Franklin, American naval officer: b. Baltimore, Md., 11 Feb. 1811; d. Washington, D. C., 30 June 1883. He entered the navy as midshipman in 1828, was commissioned lieutenant in 1840 and served in the Mexican War. In 1851–59 he was engaged in the coast-survey service, receiving promotion to commander in 1855. In 1862 he was commissioned captain. In 1862–65 he was senior officer in command of the blockade off Wilmington, N. C., participated in both attacks on Fort Fisher, was in command of the blockade off the coast of Texas from February to June in 1865, and raised the flag at Galveston, the last post held by the Confederates. He was commissioned commodore in 1866, was superintendent of the naval observatory at Washington in 1867–73, commissioned rear-admiral in 1871 and placed on the retired list in 1874.

SANDS, Henry Berton, American surgeon: b. New York, 27 Sept. 1830; d. there, 18 Nov. 1888. He was graduated from the College of Physicians and Surgeons in 1856 and later studied abroad. On his return from Europe he became demonstrator of anatomy at the College of Physicians and Surgeons; in 1869 was appointed professor of anatomy and in 1879 professor of the practice of surgery, holding the latter position till his death. He was attendant or consulting surgeon for several different hospitals, but gradually gave up his hospital work to give his attention to a rapidly increasing private practice. He became one of the foremost surgeons of the city and was called for consultation in President Garfield's case. His publications include 'Aneurism of the Sub Clavian, treated by Galvano Puncture' (1869); 'Esmarch's Bloodless Method' (1875); 'Treatment of Intussusception by Abdominal Method' (1877); 'Question of Trephinery in Injuries of the Head' (1883), and 'Rupture of the Ligamentum Patellæ and its Treatment by Operation' (1885).

SANDS, Robert Charles, American poet and author: b. Flatbush, L. I., 11 May 1799; d. Hoboken, N. J., 17 Dec. 1832. He was graduated from Columbia in 1815, admitted to the bar in 1820, but devoted himself almost exclusively to literature. He established and edited in 1824 the *Atlantic Magazine,* which later became the New York *Review,* and in 1825–27 was associated with William Cullen Bryant in editing it. From 1827 until his death he was on the editorial staff of the *Commercial Advertiser.* He wrote with Bryant and Verplanck a series of essays published in the form of an annual, 'The Talisman' (1828–30), in which appears one of his longest poems, 'The Dream of the Princess Papantzin.' He also wrote 'Historical Notice of Herman Cortes' (in Spanish, 1828); 'Life and Correspondence of Paul Jones' (1831); 'The Dead of 1832' (poem, 1832), etc.

SANDS, William Franklin, American diplomatist: b. Washington, D. C., 29 July 1874. He was educated at Saint Michel, Fribourg, Switzerland, Stella Matutina College, Feldkirch, Austria, and Georgetown University, Washington, D. C. He was appointed second secretary of the American legation at Tokio, Japan, in 1896; became first secretary at Seoul, Korea, two years later and was chargé-d'affaires ad interim in 1899. From 1900 to 1904 he was adviser to the emperor of Korea, in 1905–07 was secretary and chargé at Panama, in 1907–

08 in Guatemala and in 1908–09 in Mexico. In 1909–11, Mr. Sands was American Envoy Extraordinary and Minister Plenipotentiary to Guatemala. While in Korea he suppressed a revolution on the island of Quelpaert and for his services to French citizens during the Boxer Rebellion he was made Chevalier of the Legion of Honor. Mr. Sands is a member of the American Society of International Law and of the American Geographical and other societies.

SANDSTONE, consolidated sand. The grains of a sand, chiefly silica, may be compacted by pressure alone, forming easily workable free stone, but generally they are held together by some cement, as (1) iron oxide, which coats the grains and cements their adjoining portions, forming a brown-stone; (2) silica, which fills in the interstices between the grains and generally causes secondary enlargement of each grain in such a manner that the new quartz forms a continuous crystal (as far as optical properties, etc., are concerned) with the old quartz grain, the rock thus becoming a solid mass of crystalline quartz; (3) lime; or (4) clay, forming calcareous and argillaceous sandstones respectively. Impure quartz sandstones may be argillaceous, calcareous, feldspathic, glauconitic or micaceous, according to the admixture. When derived from unassorted disintegration-products of crystalline (feldspathic) rocks, they are called "arkoses." Sandstone composed wholly or in large part of comminuted coral or shell sand, cemented by infiltrated calcium carbonate, have been called "calcerenites," and make up extensive beds of clastic limestones to which the name sandstone is commonly applied by the quarrymen. Such lime-sandstones may analyze as high as 99.6 per cent calcium carbonate. Ordinarily the term sandstone is applied to quartz sandstones whether pure or impure.

Sandstone very commonly shows lines of stratification or bedding, where exposed in section, and a cross-bedding structure is very common, the various minor layers of a bed being inclined in different and often opposite directions. All sandstones of shallow-water deposit may show ripple marks, rill marks, wave marks and impressions and traces of various animals, while æolian sandstones may show fine bedding and wind rippling, together with great diversity in thickness. Fossils are not uncommon in sandstones, but only their impressions generally remain in the more porous rocks.

In the United States quartz sandstones are widely distributed geographically and geologically. Among the more important commercial deposits are the following: The Cambric sandstone of New York (Potsdam sandstone), Wisconsin, Minnesota, Michigan, etc. (Saint Croix sandstones), and the Rocky Mountain region, as well as early Cambric sandstones of the southern Appalachians; the Ordovicic (Saint Peter's) sandstone of the upper Mississippi; Medina (Siluric) sandstones of New York and Pennsylvania; the Oriskany, Hamilton and Portage (Devonic) sandstones of New York, mostly used for flagging purposes; the Waverly (Lower Carbonic) sandstones of Ohio, which furnishes the bulk of all the whetstones and grindstones of the country; the Pottsville and lower Coal-measures sandstones of Pennsylvania, West Virginia, etc.; the red-sandstones of the Connecticut Valley; New Jersey and Nova Scotia (Jura-Trias), and the Dakota (retacic) sandstone of the West.

"Old Red Sandstone" is the term applied to the continental (non-marine) type of deposit formed during the Devonic era in Great Britain and Ireland. This consists of a mass of red sandstone shales and conglomerates from 10,000 to 16,000 feet in thickness and contains igneous rocks aggregating 6,000 feet thick near the middle. From it many remarkable first-remains have been obtained. New Red sandstone was used for red sandstone of Permian and Triassic age in Great Britain. Consult Ries, H., 'Building Stones and Clay Products' (New York 1912); 'Mineral Resources of the United States' (Washington, ann.).

SANDUSKY, Ohio, city, port of entry, county-seat of Erie County, at the mouth of the Sandusky River, on Sandusky Bay, and on the Baltimore and Ohio, the Cleveland, Cincinnati, Chicago and Saint Louis, the Pennsylvania, the Lake Erie and Western and the New York Central railroads, about 55 miles west of Cleveland. A number of electric railroads enter the city from Cleveland, Toledo, Loraine, Norwalk and other places. Johnson's Island, near by, was used as a place of confinement for Confederate prisoners during the Civil War. Cedar Point, Put-in-Bay, Kelly's Island, Middle Bass, Pelee and Gibraltar islands are all favorite fishing resorts and easy of access during the summer months. The city has steamer connections with all the principal ports on the Great Lakes and considerable trade with Canada. The city is in a fertile agricultural region, in which the chief products are grapes, peaches, apples, grain and vegetables. Fishing is an important industry of the city; the annual amount sold in the local market and shipped is $1,500,000. Until prohibition the annual wine output was 2,000,000 gallons. Sandusky has 141 industrial establishments, 28 of which are engaged in the products of iron and steel and other metals. Farm tractors, marine aeroplanes and stationary motors, iron and steel castings being a large part of this number. Other important products are brick, glass, limestone, sand, wearing apparel, paper and paper products, boxes, tools and cement. There are large coal and lumber yards. The coal export business ranks very high, the Pennsylvania Railroad maintaining the largest single road coal terminal on the Great Lakes. Chemicals, paints, crayons and dyes are fast becoming one of the major industries, the largest part of the crayons used in the United States being manufactured here. There are two daily and two weekly newspapers. In 1915 the value of the annual product of the various industrial establishments in Sandusky was $15,508,000, with an annual payroll of $3,500,000. The United States hatcheries at Put-in-Bay and the State hatcheries at Lakeside foster the fish industry. There are four banks, two national and two State, with a combined capitalization of $550,000 and total assets of $9,000,000. The principal public buildings are the government building, public library, county courthouse, the State Soldiers and Sailors' Home with accommodations for 1,600 persons, and the new high school building, erected at a cost of $275,000. Sandusky has 25 churches, 6 public grade school buildings besides the high schools, 4 parochial schools and a modern business college. The city was first settled in 1817 and was incorporated as a city in 1845. The Indians on 16 May 1763 captured Fort Sandusky and massacred the entire garrison with the exception of Ensign Paully, the commander. In 1782 the Indians defeated a force of 480 men under the command of Colonels Williams and Crawford. The municipal affairs are administered by a city commission of five and a city manager operating under the charter of 1915. Pop. (1920) 22,897.

SANDUSKY, a bay indenting the northern part of Ohio, an inlet of Lake Erie. It is 20 miles long and five miles wide and forms an excellent harbor. In some places large groves extend almost to the water edge.

SANDWICH, John Montagu, 4TH EARL OF, English politician: b. 3 Nov. 1718; d. London, 30 April 1792. He was educated at Cambridge, traveled extensively in the Mediterranean countries and in 1739 returned to England where he took his seat in the House of Lords and became a political follower of the Duke of Bedford. He became Lord Commissioner of the Admiralty in 1744 and was shortly afterward appointed captain in the Duke of Bedford's regiment. His promotion in the army was rapid and at his death he was senior general on the list. He was appointed Ambassador to Madrid in 1763, but before he could depart on his mission he was made one of the principal Secretaries of State. While in this office he took part in the famous prosecution of John Wilkes. In 1768 he became Postmaster-General and in 1771 was nominated First Lord of the Admiralty, an office he held for 11 years. His own gain and party interest were made of paramount importance and to the insufficient equipment of the navy was justly laid much of the disaster which the British navy encountered in those years. His administration was on the whole disastrous; his immoral private life was revealed by the murder of his mistress, and perhaps no man of the 18th century was held in more bitter contempt in England. He lived a practically retired life after 1782 and is the reputed inventor of the sandwich as a time-saver for his gambling propensities.

SANDWICH, Canada, town and county-seat in Essex County, province of Ontario, on the Detroit River, opposite the city of Detroit, Mich., and three miles below Maidstone, Ontario. There is a Roman Catholic college, a government fish hatchery and manufactures of wines and robes. Pop. (1921) 4,419.

SANDWICH, England, a cinque port and market-town in Kent. Saint Clement's Church is an example of early Norman architecture, and Saint Peter's dating from the reign of King John, has been restored and contains fine mediæval monuments.

SANDWICH, Ill., city in De Kalb County, 50 miles west of Chicago, on the Chicago, Burlington and Quincy Railroad. There are manufactures of corn shellers, plows, reapers and windmills. Pop. 2,409.

SANDWICH ISLANDS. See HAWAII.

SANDY HILL, now **HUDSON FALLS,** N. Y., village in Washington County, on the Hudson River, the Delaware and Hudson and the Hudson Valley railroads, about 52 miles north of Albany. There are rapids in the Hudson and Baker's Falls about 70 feet in descent, which serve to furnish good water power. Hudson Falls is in an agricultural region and in the vicinity are quarries of the well-known Kingsbury building stone. The chief industrial establishments are lumber mills, brick yards, furnaces, machine shops, paper and pulp mills, wall-paper print works and the extensive bag factories of the Union Bag and Paper Trust. There are large shipments of stone, farm products and manufactures. The three national banks have a combined capital of $150,000. The village has an excellent high school, public graded schools and a public library founded in 1867, also a public park. It is one of the two county-seats of Washington County (Salem the other), has a courthouse and jail; also county clerk's office removed there (1905) from Argyle. Its name was changed to HUDSON FALLS in 1910. Between Hudson Falls and Fort Edward in the Union Cemetery is located the grave of Jane McCrea (q.v.); also that of Maj. Duncan Campbell of Inverawe, killed at the battle of Ticonderoga, 1758. Pop. (1920) 5,761.

SANDY HOOK, N. J., a low, sandy peninsula in Monmouth County, about 18 miles south of New York. It begins at the Navesink Highlands and extends north six miles; its width is less than a mile. On the west side of the peninsula is Sandy Hook Bay. At the northern extremity is a beacon light and, about a mile south of this point, is a lighthouse, 90 feet in height. At the outermost point is Fort Hancock. On the peninsula is a government proving-ground for ordnance and armor-plate.

SANDYS, Sir Edwin, English statesman and colonist, second son of Edwin Sandys, archbishop of York: b. Worcestershire, 9 Dec. 1561; d. October 1629. He was graduated at Corpus Christi College, Oxford, in 1579, taking his B.C.L. there in 1589. He entered upon a political career in 1599 and became a supporter of James I, upon whose coronation in 1603 he was knighted. He was a member of the king's first Parliament, and in 1619–21 he was treasurer of the Virginia Company, which he ably promoted, rendering assistance enabling it to surmount many initial difficulties, and continuing his interest in the colony's affairs until his death. He was in his later years suspected of sympathy with the Parliamentary cause, but retained the favor of the king. Consult Brown, A., 'Genesis of the United States' (1890); Fiske, J., 'Old Virginia and Her Neighbors' (2 vols., 1900).

SANDYS, George, English poet, traveler and Virginia colonist, brother of Sir Edwin Sandys (q.v.): b. Bishopsthorpe, Yorkshire, 2 March 1578; d. Boxley, near Maidstone, Kent, 1644. He studied at Oxford and later traveled in France, Italy, Turkey, Egypt and Palestine, writing an account of his journeys, which was of considerable ethnological and geographical value. He was appointed treasurer of the Virginia Company in 1621, succeeding his brother, Sir Edwin, and sailed for Virginia soon afterward. He built the first water mill there and established shipbuilding and iron works. He was treasurer until 1625 and was appointed member of council in 1624–26–28. In 1631, after some controversy concerning his alleged infringements of the rights of other settlers, and failing to receive the post of secretary to the

new Commission for the Better Plantation of Virginia, he returned to England. He translated while in Virginia the first 10 books of Ovid's 'Metamorphoses' (1626), the first work of the sort accomplished in America, and upon which his reputation as a poet rested to a considerable extent. He was also author of 'Paraphrase upon the Psalms and Hymns' (1636); 'Paraphrase of the Song of Songs' (1641), and translated Grotius's 'Christ's Passion' (1640).

SANFORD, Edmund Clark, American college president: b. Oakland, Cal., 10 Nov. 1859. He was graduated at the University of California in 1883 and in 1888 took his Ph.D. at Johns Hopkins University, where he held a fellowship in 1887–88. He taught at Oahu College, Honolulu, Hawaii, in 1883–85; became connected with the faculty of Clark University in 1889, was professor of psychology there since 1900. He was president of Clark College from 1909–20. From 1895 he was joint editor of the *American Journal of Psychology;* and he was president of the American Psychological Association in 1902. He is author of many papers on psychology and of 'A Course in Experimental Psychology' (1898).

SANFORD, Henry Shelton, American diplomatist: b. Woodbury, Conn., 15 June 1823; d. Healing Springs, Va., 21 May 1891. He studied for a time at Heidelberg University and in 1847 entered the diplomatic service and became attached to the Saint Petersburg legation. The next year he was acting secretary to Andrew J. Donelson at Frankfort and during 1849–54 secretary of legation at Paris. He was United States Minister to Belgium, 1861–69, and rendered service of the utmost importance during the Civil War. He negotiated the Scheldt Treaty of navigation and commerce and the first postal convention with France. In 1877 he was a founder of the International African Association (now the Independent State of the Kongo) and secured the recognition of its independence by the United States. In 1885 he was a delegate to the International Kongo Conference at Berlin, and in 1889 a delegate to the Anti-Slavery Conference at Brussels. In 1870 he founded the city of Sanford, Fla., and in later years gave much attention to its development.

SANFORD, Fla., city in Seminole County, on Lake Monroe, an expansion of the Saint John's River, and on the Atlantic Coast Line, 125 miles south of Jacksonville. The land was sold to Gen. H. S. Sanford in 1870, and he surveyed and cleared the site of the city, and built a saw mill, shops, etc. It has brick-paved streets and cement sidewalks. It is at the head of navigation for large steamers and exports oranges and other fruits and early vegetables including great quantities of celery. It contains railway car shops, machine shops, fruit preserving and cigar factories. There is an efficient public school system. Pop. 5,588.

SANFORD, Me., town in central part of York County, on the Mousan River, and on the Boston and Maine Railroad, 35 miles southwest of Portland. The land was purchased from the Indians in 1661 and the project of laying out a town was formed as early as 1676, but no permanent settlement was made till after 1730 — the exact date being uncertain. The chief manufacturing industries include shoe factories, woolen and worsted mills, flour and grist mills, saw and lumber mills; a capital of about $5,000,000 is invested in its industries. A large electric power shop derives power from the river and supplies the factories and lights for the town. There is a high school, established in 1874, and a public library which was founded by a library association in 1898 and became a free public library in 1900, and a town-hall. Its three banks have combined resources amounting to $3,100,000. The value of taxable property is $4,800,000. The government is vested in a town clerk, three selectmen, a treasurer, school board of three, auditor and the usual minor town officials. The municipal receipts and expenses average about $133,000. Pop. (1920) 10,691.

SANGALLO, săng-gäl'lō, **Antonio da,** Italian architect: b. Florence, 1455; d. there, 1534. He built in Montepulciano the church of the Madonna di San Biagio; the palaces Cervini and Bellarmini; in San Savino the palace of the Cardinal di Santa Prassede, in Arezzo the church of the Annunziata and the citadel in Civita Castellana.

SANGALLO, Antonio da (Coordiani), Italian architect, nephew of the preceding: b. Mugello, near Florence, 1485; d. 1546. He designed and built the church of Madonna di Loreto, at Rome; the Porta di San Spirito; the church of San Spirito; the palace Sacchetti; the palace Farnese; all in the same city. He also enlarged the Vatican and executed the famous fountain at Orvieto and had a share in building the Pilgrim's Church at Loreto. He was also successful in the construction of fortifications.

SANGALLO, Juliano da, Italian architect (brother of Antonio the Elder): b. Florence, 1445; d. there, 1516. At Florence he built the monastery of Santa Maria Maddalena de Pazzi and the Palace Condi; in Prato, the church of Madonna delle Carceri; in Cajano, the Villa Poggio for the Medici. He also constructed the fortress at Ostia; and in Rome he built the façade of Santa Maria dell Anima; the monastery of San Pietro in Vincoli, and the flat roof in the church of Santa Maria Maggiore. He also constructed the citadel at Pisa. Consult Redtenbacher, 'Die Architektur der Renaissance' (1886).

SANGAMON, săng'ga-mŏn, a river of Illinois, its headwaters are in Champaign and McLean counties. It flows southeast to Sangamon County where it unites with the south fork of the river, and changes the direction of its course, flowing northwest, then west, then northwest and enters the Illinois River by two channels. Total length, 225 miles. The confluence of the main stream (north fork) and the south fork is six miles east of Springfield and the mouth of the river is about 44 miles west-northwest of Springfield.

SANGER, Adolph L., American lawyer: b. Baton Rouge, La.; d. New York, 3 Jan. 1894. He was graduated from the Columbia College Law School in 1864, and in the practice of his profession won rapid success. In 1870 he was appointed one of the commissioners of the United States Deposit Fund, and in 1885 was elected president of the board of aldermen of New York by a plurality of 25,000 votes. He

was a Presidential elector of the State of New York in 1880 and 1884, and 1886 was appointed commissioner of education, serving for three terms, and elected president of the board in 1893. He was one of the leaders of the Order of "B'nai B'rith," was president of the Board of Delegates of American Israelites, and for some years vice-president of the Union of American Hebrew Congregations.

SANGER, Joseph Prentice, American military officer: b. Detroit, Mich., 4 May 1840. In 1858–60 he studied at the University of Michigan and in 1872 received the degree of A.M. at Bowdoin. He served in the Civil War, being successively second lieutenant of the First Michigan Infantry, second lieutenant of the First United States Artillery and first lieutenant after October 1861 with battery of light artillery. He was wounded and was twice brevetted for gallantry; was orderly officer to President Lincoln for a short time in 1862, and after the war was adjutant of his regiment. He took part in the expedition against the Fenians in 1866. In 1872–75 he was professor of military science, tactics and law at Bowdoin and in 1874 was admitted to the bar at Portland, Me. He was detailed to accompany General Upton on a tour of inspection of the armies of Japan, China, Persia, India, Turkey, Italy, Russia, Austria, France and England in 1875–77. In May 1898 he was made brigadier-general and in 1899 was assigned to command the department and subsequently the district of Matanzas, Cuba. Subsequently he was made director of the census of Cuba and Porto Rico; in 1901–02 was inspector-general and chief of the staff, director of the Philippines, director of the Philippine census in 1902; became major-general in 1904 and was retired the same year. In 1910 he was a member of the Brownville court of inquiry.

SANGIR (săng-gēr') **ISLANDS,** Malay Archipelago, a group midway between the northeast extremity of the Celebes and the southern extremity of the island of Mindanao in the Philippine group. The largest islands of the group are Great Sangir, Siau (Siave, Siauw) and Tagulanda. The former is the most northerly and contains the volcano of Aboe (4,000 feet), whose eruptions of 1812, 1856 and 1892 caused great destruction and appalling loss of life. All of the islands are mountainous, partly volcanic and well cultivated. From the craters of the volcanoes of Siau and Roang constantly issue clouds of sulphur, and earthquakes are frequent. The chief products are rice, pisang, sago and cocoanut-oil. Edible birds' nests abound in the smaller islands, yielding considerable profit. The exports are copra, nuts and nutmegs. The natives are Malays. They adopted in the 15th century the Mohammedan faith, but were afterward converted to Christianity by the Portuguese. The islands constitute a dependency of the Netherlands, and through the missionaries schools have been built. The islands are governed by padschas or princes. Pop. 76,900.

SANGRAAL, săng-grāl'. See Grail, The Holy.

SANGRE DE CRISTO, săn'grā dā krēs'tō, a range of mountains in the south central part of Colorado. See Rocky Mountains.

SANGSTER, Charles, Canadian poet: b. Kingston, province of Ontario, 16 July 1822; d. 1893. He was self-educated, and in 1849 became editor of the Amherstburg *Courier,* but shortly afterward returned to Kingston and engaged in journalism there. He was employed in the Post-office Department at Ottawa in 1868–86. His verse received favorable notice both in America and England, and the highly patriotic character of it is credited with greatly advancing the cause of confederation in Canada. Author of 'Saint Lawrence and the Saguenay' (1856); 'Hesperus and Other Poems' (1860).

SANGSTER, săng'stĕr, **Margaret Elizabeth Munson,** American writer: b. New Rochelle, N. Y., 22 Feb. 1838; d. 3 June 1912. In 1858 she was married to George Sangster, engaged in writing for periodicals and in 1871 became associate editor of *Hearth and Home.* In 1873–79 she was editor of *The Christian at Work* and in 1889–99 she was editor of *Harper's Bazaar.* After 1899 she was a staff contributor to the *Ladies' Home Journal.* Her works are marked by a high religious purpose and an earnest desire to brighten and beautify everyday life. Her juvenile works include 'May Stanhope and Her Friend'; 'Little Knights and Ladies,' etc. Among her most noted poems are 'Our Own'; 'The Sin of Omission'; 'Are the Children Home?' and her other publications include 'Poems of the Household' (1883); 'Home Fairies' (1887); 'Winsome Womanhood' (1900); 'Lyrics of Love' (1901); 'The Little Kingdom of Home' (1904).

SANGUINARIA, a monotypic genus, the bloodroot (q.v.) of the family *Papaveraceæ,* indigenous to eastern North America and often cultivated for ornament. It prefers sheltered places in woods, where it can grow in leafmold. The thick, palmately lobed leaf is lapped around the bud, which swiftly outgrows its protector, loses its two fugacious sepals and opens into a star-shaped flower with several fleshy white petals and a mass of golden stamens in the centre. The flower closes again at night or on shady days, since it blooms in the earliest, cool days of spring. The leaves continue to grow during the summer and become nearly seven inches long. The seeds are contained in spindle-shaped capsules. The whole plant is very brittle and succulent and when broken, especially at its thick fleshy rootstock, an acrid red juice flows copiously forth. This juice has caused the plant to be called bloodroot, and it was considered, by the doctrine of signatures to be a cure for blood diseases; later it becomes officinal as a cathartic, emetic and expectorant. The sanguinaria is also called red puccoon or Indian paint, because the aborigines used it as a stain for their skins and as a dyestuff.

SANHEDRIN, săn-hē'drĭn, a Jewish court of justice, especially the supreme judicial tribunal of the Jews, existing in and before New Testiment times. According to rabbinical tradition the institution of the Sanhedrin is to be traced to the time of Moses and the events mentioned in Num. xi, 16, 17, but this view is now generally rejected, and the time of its institution referred to a much later date. The most probable opinion is that it consisted of 71 members, including the president. From incidental notices in the New Testament we

learn that the members were drawn from three different classes: "the chief priests," consisting partly of those who had previously filled the office of high-priest and partly of the heads of the 24 classes into which the priests were divided: "the elders of the people," that is, the heads of tribes and family associations; and "the scribes," or those learned in the law. The Sanhedrin sat originally within the temple precincts every day from the conclusion of the morning sacrifice until the evening sacrifice; excepting on Sabbaths and festivals. At its head was a president, who bore the honorable title of *nasi or prince*. The jurisdiction of the Sanhedrin, as the supreme tribunal of the Jews in civil as in ecclesiastical matters, was very extensive. It was the final court of appeal from all inferior courts; and, in addition to this, it alone had the right of judging in matters affecting a whole tribe, of determining questions of peace or war, of trying the high-priest or a disobedient member of its own body. It pronounced also upon the claims of prophets and upon charges of blasphemy. Its jurisdiction was not confined to Palestine, but extended to every place where the Jews had settlements (Acts ix, 2). According to the Jerusalem Gemara, the power of inflicting capital punishment was taken away from this tribunal 40 years before the destruction of Jerusalem, and this accords with the answer of the Jews to Pilate (John xix, 37), "It is not lawful for us to put any man to death." It might indeed pass sentence of death, but it required the confirmation of the Roman procurator before such sentence could be executed. The forms of procedure in the court seem to have been characterized by a general spirit of fairness. Different kinds of evidence were carefully weighed, and the agreement of at least two witnesses was necessary to procure a sentence of condemnation. A majority of the full membership was sufficient for a sentence. The place of meeting of the Sanhedrin was eventually changed to a portion of the court of the Gentiles, and, after several other changes, its seat was finally established at Tiberias. Besides the great Sanhedrin there were also inferior courts or lesser sanhedrins in the country towns, composed of persons of the same classes, and in contradistinction to these, the metropolitan council was termed the Great Sanhedrin. After the destruction of Jerusalem by the Romans these courts were abolished. Napoleon I convened a court under the name Sanhedrin, and it established 12 legal principles for the government of Jews in France. This was also called the Assembly of Notables and was dissolved in 1897. Consult Tama, 'Transactions of the Parisian Sanhedrin' (London 1807).

SANHITA, săn'hĭ-tä, the Hindu designation of that part of the sacred writings of the Brahmins, which contain the mantra or hymns.

SANIDINE, or GLASSY FELDSPAR, an important rock-forming mineral. It is a variety of orthoclase, is found in tabular or square-prismatic crystals, often Carlsbad twins, frequently quite vitreous in appearance. It occurs only in the recent eruptive rocks such as obsidian, phonolyte, trachyte and rhyolite. Its best-known locality is the Drachenfels, Germany.

SANITARY COMMISSION. See UNITED STATES SANITARY COMMISSION, THE.

SANITARY ENGINEERING, the branch of civil engineering which relates to structures and operations for promoting and guarding the health of communities. It deals with the means of providing cities and towns with pure and wholesome water, with the means for the removal in underground channels of the spent water supply called sewage, as well as of such ground water and rain water as may be necessary, and also with the means of collecting and removing the various solid waste products and refuse by cartage, such as garbage, rubbish, ashes and street sweepings. In other words, sanitary engineering embraces the design and construction of all works contributing to public health and comfort and all means of preventing offensive conditions due to a large number of persons living closely together, as in cities or towns.

In all cases the sanitary engineer, giving his first attention to sanitation, should have for his second purpose the construction of his works so as to bring about the desired result at the least cost, when considering both the first investment and the operating expenses.

The relations of the public health to this branch of engineering are made plain in the article SANITARY SCIENCE. With the rapid advance of practical knowledge the profession of sanitary engineering has in recent years gradually called for an increased practical knowledge of vital statistics, of chemistry and biology as applied to its special branches. It is not necessary for the sanitary engineer to be a trained analyst, or accomplished in the details of state medicine, but he should be in touch with the general progress in these subjects, if his work is to be on the highest plane of excellence. This necessity will be better appreciated after noting a brief review of the leading phases of sanitary engineering.

In Europe, progress in sanitary engineering commenced at an earlier date than in America, largely because the population abroad was much denser. The need for improvements resulted in laws which compelled the installation of better sanitary works at a rapid rate. In this country the States of Massachusetts, New York, Ohio and a few others, through their boards of health, have a general supervision of questions of water supply and sewerage, so far as the sanitary aspects of new or additional works are concerned. This has been generally helpful, and eventually will probably be extended to practically all of our States. The rules, regulations, etc., of the State sanitary authorities on these matters is a feature of the subject which the sanitary engineer has to consider, as well as the decision of courts where these form a precedent relative to the sanitary problem under consideration.

For a clearer discussion of the subject to be dealt with hereunder, it will be well to divide it into three parts: (1) Water Supply and Its Purification; (2) Sewerage and Sewage Disposal, and (3) Refuse Collection and Disposal.

1. Water Supply and Its Purification.— In Biblical days, pure mountain water in some instances was collected and conveyed through gravity aqueducts to cities and towns. There are some cases to-day, even in civilized countries, where substantially the same procedures as used many centuries ago are still applied. Generally speaking, however, the rapidly increasing density of population, the wide differences in climatic, geological and topographical conditions, and the improvements made in materials and methods of construction, have rendered necessary a vast elaboration of the early principles, in order to furnish the essential basis upon which modern water supplies under various conditions are built and operated. This is true to a greater degree in the case of works for the purification of sewage and water, and the disposal of garbage, which have more recently furnished practical problems in this country.

In the field of water supply engineering there are some instances where pure mountain waters can be readily obtained; some where the supplies can best be obtained from underground sources; others where the most available supplies are obtained from rivers near at hand, which require purification and pumping to reservoirs of artificial construction and still other instances where large cities have at hand only small streams, upon which it is necessary to build large dams to store water during the rainy seasons to serve the needs of the community during times of drought.

Before the development and general acceptance about 1880 of the germ theory of disease, comparatively little attention was given to the sanitary character of water supplies. Although the danger of sewage pollution was then recognized by some, its full significance was not appreciated, especially in the case of watersheds where the population was largely rural in its nature, until there were encountered disastrous typhoid fever epidemics, as at Plymouth, Pa., Lowell and Lawrence, Mass., New Haven, Conn., etc. In recent years there has been a marked awakening to the needs of pure water supplies in America, as shown by the consideration given this subject by a majority of the larger cities, and by the practical accomplishments reached in many instances. Compared with the European water supplies, there is yet wide room for improvement in this country, as our prevailing standards are generally below those established in northwestern Europe. Thus, in Germany it is an edict of the Imperial Board of Health, following the cholera epidemic in Hamburg in 1892, that no surface water shall be used as a public water supply without first being filtered in a satisfactory manner. In Europe generally this view is now held, and the benefit is shown by the fact that the death rate from such water-borne diseases as typhoid fever is only one-third to one-half of what it is in American cities.

As to the so-called mountain streams, the rapid increase in population in this country makes it each year more and more difficult to obtain even reasonably pure municipal water supplies from sparsely inhabited watersheds. In the case of small cities and towns this can still be done in some instances, but usually it necessitates the purchase of many properties situated on the watercourse, and a systematic patroling of portions of the remaining area, in order to guard constantly against pollution. This latter procedure is especially effective in conjunction with large storage reservoirs in which self-purification takes place, as in the case of the New York and Boston supplies.

A ground water supply, where the conditions are favorable, yields as good a water from a sanitary standpoint as can be obtained. This results, of course, from the efficient filtration which takes place under the conditions of nature, as the rainfall percolates through the earth and reaches the underground natural reservoirs from which it is drawn. In this country the most notable ground-water supply is that which furnishes about half of the supply for the city of Brooklyn, and aggregates a daily quantity of about 50,000,000 gallons. Long Island is essentially a large territory of sand, the pores of which afford facilities for the storage of large volumes of rain-water in this naturally formed reservoir, and from which water can be obtained continuously during ordinary dry weather in daily quantities equal to at least 400,000 gallons per square mile. These conditions are unusual, and there is no other instance where such a large volume of underground water is obtained. Many small cities and towns, however, obtain a satisfactory supply from underground streams, which flow through valleys containing deep layers of porous sand and gravel. With varying conditions in the geological formation, these underground supplies naturally present marked differences in the quality of water obtained therefrom. In some instances the ground water is very highly charged with lime and magnesia, thus making the water too hard for acceptable use by the consumers, and especially by those who use it for steam-raising purposes. Under these conditions the sanitary engineer has sometimes to consider the chemical aspect of the problem and to recommend plans for the softening of the water, such as is the case in many places in the southern part of England, where water is obtained from wells driven into the chalk cliffs, and in some of our own cities of the Middle West.

Another feature which the sanitary engineer has to consider with regard to ground waters is the presence of iron dissolved from the materials in which the underground water is stored, and which causes it to deposit iron rust, which is seriously objectionable because of the stains it produces in laundry use. This feature can be eliminated by aërating the water and passing it through filters, as is done at Reading, Mass., Red Bank, N. J., West Superior, Wis., and a number of places in the northern parts of Germany and Holland.

Water derived from rivers flowing near cities and towns forms one of the principal sources of supply in America. In early years raw-river water supplies were fairly satisfactory in their hygienic condition. But with the rapidly increasing population, river pollution has become so great that now it is rare for a town or city of any size to obtain a fairly satisfactory supply from river water when taken in its raw condition.

In the Southern and Western country there is the added difficulty of the well-known muddiness, due to the large quantities of silt and clay entering the rivers from soil erosion, and which for many months at a time make the water decidedly turbid and dirty. To remove this silt and clay constitutes one of the prin-

cipal tasks of the sanitary engineer. This, as is described in WATER SUPPLY, is accomplished by sedimentation and filtration, and in the last few years a large number of the more important cities have projected, or are building, improvements of this nature.

The cities situated upon the Great Lakes at one time obtained from them clear and pure water quite readily. In the instance of several of the larger cities, however, the time has arrived or is rapidly approaching when there is serious difficulty in obtaining pure water from the lakes in its raw condition, owing to the amount of sewage which reaches the water supply intakes. Usually the pollution is from the city's sewers, but in some instances it is from those of neighboring cities. The earlier intakes, located half a mile or so from shore, were presumably in many cases capable of yielding as pure water as now can be obtained from intakes four miles or more distant from the shore. That the time is approaching when some treatment of the lake supplies is becoming desirable, if not necessary, is shown by the consideration given to that subject by the cities of Milwaukee, Chicago, Cleveland and Buffalo.

In the northern, and especially in the northeastern, section of the country, water supplies are frequently obtained from small streams, upon which it is necessary to store water in large impounding basins in order that portions of the rainfall of wet seasons may be made available for seasons of drought. This has developed many problems for the sanitary engineer to consider, especially the care necessary in the selection and preparation of reservoir sites to guard against various vegetable growths, such as give rise to objectionable tastes and odors. The storage of water for long periods of time in such basins naturally results in sedimentation, and in bleaching should the water be colored, which improves the quality of the water so far as its appearance and sanitary aspects are concerned, and which incidentally brings about safety through the long interval which elapses as the water passes through the basins, thus bringing about the death of many objectionable germs which enter the reservoir.

The number of water purification plants for municipal water supplies is rapidly increasing each year, and eventually it is fair to assume will include every important surface-water supply in America, as is now the case in the most developed parts of Europe. There are now in this country over 200 filtration plants, the great majority of which are plants of the so-called rapid or mechanical type, which were built at first in a not very durable manner and are lacking in many appurtenances now recognized as essential to good works.

While filtration works will always be necessary where the raw water is sometimes or always turbid and unpleasant to sight, there are many cases where the expense for filtration is prohibitive, but where some treatment or purification is necessary.

Since about 1905 a process has been developed in this country which has been a great boon to the sanitary engineer. It had been found that small amounts of hypochlorite of lime, and later of liquid chlorine, when added to the water would destroy pathogenic bacteria contained in it and yet not be injurious to the consumer of the water. It was found contrary to what had previously been thought necessary, that not all bacteria required destruction, but only those that were pathogenic and fortunately least resistant to the chlorine. By this simple and comparatively inexpensive means, typhoid fever and similar bowel diseases, when due to a polluted water supply, are almost entirely prevented.

While American engineers can design and build good filtration plants, it is an unfortunate fact that up to the present time the filtration plants in America, of both the slow or sand type and the rapid or mechanical type, have not, generally speaking, been well operated, although there are exceptions to this rule in the case of filtration works of each type. The proper operation of waterworks systems to provide palatable and pure water at all times, especially in connection with purification or filtration works, is of exceeding importance and will require the aid of engineering talent. In this field there appears a favorable opening for many young sanitary engineers. In addition to the sanitary aspect of waterworks engineering, the engineer has frequent occasion to use his judgment and knowledge concerning other line of hydraulics, including the flow of streams, the construction of dams and reservoirs, pumping stations and distributing systems which will afford suitable quantity of water and pressure not only for domestic use but also for fire purposes. The engineer by his knowledge cannot only heighten the efficiency of his works, but save large sums of money, as, for instance, in the distribution system, by applying among others the principle that a pipe of double capacity will not cost twice as much money, etc.

It is important to control the quality of the water, not only for sanitary purposes, but also for the preservation of the piping system in a proper condition. If in purification plants too much carbon dioxide is allowed to remain in the water, we are apt to get the «red-water plague» caused by the rusting of the pipe system. It is also important to guard the supply from acquiring tastes, due to dead vegetation, which are difficult, if not impossible, to remove in modern filter plants.

2. Sewerage and Sewage Disposal.—A sewerage system has for its purposes the collection and removal of the foul waters of a community. The term «sewerage» is applied to the system of collecting pipes and underground channels. It begins in the houses at the various receptacles where water is used for cleansing purposes, extends through the streets and ends at one or more places where this dirty water, which we call sewage, is finally discharged. Sewage contains a small quantity of organic refuse matter in a condition to be easily and rapidly decomposed. In round numbers it contains in our country less than one part of organic matter and one part of mineral matter to every thousand parts of water. Although this organic matter is so greatly dilluted, it is nevertheless capable of causing considerable trouble. It decomposes rapidly in warm weather or within 24 hours, and then putrefaction sets in with the accompaniments of offensive odors, due largely to the growth and activity of those lower forms of life called bacteria. Fresh sewage has no strong or offensive odor. It smells like dish water, and no worse odor than this prevails at the outfall or point of discharge, in a system of sewers that is not very large but is well planned, built and carefully maintained and operated.

It is one of the tasks of the sanitary engineer to cause sewage in its flow through the sewers to be discharged both quickly and completely, so as to allow no sewage matters to be stranded and retained in the sewers. To this end it is necessary that the pipes be given a grade or pitch, which will cause the sewage to flow with a good velocity and keep on moving with its suspended matter without interruption, from the starting point at the house to the place of final disposal. It is also necessary to see to it that the curves, bends, junctions, etc., are so designed and built that they will not operate to retard the flow nor allow accumulations of solid matter at various points where they will decompose and give rise to objectionable odors. An important consideration, formerly overlooked, is the necessity of giving the sewage as smooth a surface as possible to flow upon. This not only causes less friction, a greater velocity and smaller sewers, but also prevents the adhesion and growth of algæ and suspended sewage particles, which by putrefaction produce foul-smelling gases. Therefore, vitrified pipes are advantageous. When bricks are used the mortar joints should be carefully smoothed. When cement concrete is used the interior surface should be well compacted and smoothed.

To avoid trouble from bad odors it is necessary to have an open and free communication from the sewers of the houses and streets to the outer air, so that there can either be a free escape or free admission of air, as the case may be, and so that a constant atmospheric pressure is maintained on both sides of all traps to the system.

Due to the variation in the volume of liquid flowing through the sewers at different times of the day, it is impossible to avoid entirely some incidental deposits of solid matters by adhesions to the sides of the sewers, and accordingly it is essential from time to time to flush them, that is, to cause a materially increased flow of water intermittently to pass through them, either by natural or artificial means. To secure the best ventilation of the sewers it is customary to have frequent openings in the streets through manholes covered with gratings and also to extend the house pipes beyond the roofs, so that the differences of temperature in the various parts of the sewer system will permit of a free and natural circulation of air.

The removal of ground water and storm water forms another of the tasks of the sanitary engineer. In some cases they are removed in the same sewers as is the domestic sewage. Then we have a so-called combined system of sewerage. In others there are separate systems for removing the storm water and the sewage. Where cities are situated on very flat areas, drainage is one of the most important municipal works, as at New Orleans, where extensive drainage canals and pumping stations are in operation to collect the rainfall and discharge it into Lake Pontchartrain.

There were very few well-built sewers in this country, prior to 1875, and no city which was equipped with a thorough system. Since 1880 great progress has been made in this branch of sanitary engineering in America, partly due to the fact that American cities, as regards sanitary matters, were far behind the European cities, notably in England and Germany, and partly due to the rapid growth of many communities in this country. Many sewerage systems are now built in the United States, the design and construction of which compare favorably with European works.

Prior to 1880 the subject of sewage disposal and sewage purification made little demand upon the sanitary engineer, for the reason that invariably the sewage was discharged into the nearest watercourse and, generally speaking, serious nuisances did not result under the conditions then existing. With the development of sewerage facilities in this country and the increase in population this subject began to press for attention. In Europe there were a few isolated cases where sewage had been used for purposes of irrigation for 100 years or more, but it was not until the middle of the 19th century that it became the object of careful study in Europe, especially in England.

The first method of purification for the disposal of sewage was that of irrigation, that is, the application of sewage to land to facilitate the raising of crops. In some places, as Paris and Berlin and many places in England, this is still done with considerable advantage, although in no instance does the income received from the sewage farms equal the capital charges upon their purchase and adaptation for irrigation purposes. In many places, also, it is very difficult and expensive to secure adequate areas of suitable land within any reasonable distance of the community having to dispose of the sewage. This condition resulted about 1850 in England in various efforts to secure those constituents of sewage which may be used for fertilizing purposes in a manner so that they could be placed upon the market. Various chemical treatments to facilitate this end were developed and patented, until there was suggested a chemical treatment for the disposal of sewage which involved the use of one or more of nearly every chemical which was then manufactured on a commercial scale. Although all efforts then and since failed to establish any method by which the fertilizing properties of sewage could be availed of with commercial success, this proposition now and then still comes to the attention of the sanitary engineer. The cause of the impracticability of this feature lies in the great dilution of the sewage matters and the expense of handling so much other material to get in available form so little nitrogen, potash and phosphorus. In arid parts of our country the value of the fertilizing parts of the sewage is almost insignificant to that of the water itself for the irrigated farms, particularly as its supply is quite regular and reliable. The problem of sewage disposal has been and will continue to be one for the sanitary engineer to solve at the least expense necessary for getting rid of the sewage in a manner so that there will be no sanitary objection to the procedure.

After 1870 chemical precipitation processes in various forms were introduced throughout Europe, especially in England, where the density of population and the small size of the streams

first forced the attention of engineers to this general subject. In some instances chemical precipitation, which can remove under favorable circumstances about 50 per cent of the objectionable organic matter and about 90 per cent of the total suspended matter, was adequate for local conditions. In this country chemical precipitation works were built about 1890 at Worcester, Mass., and were earlier projected for Providence, R. I., although many delays occurred in the carrying out of the works for the latter city. A few small cities also adopted this method of purification, but it seems to have had no widespread development in America, nor are there indications that such will be the case in the future. In England chemical precipitation methods have in many cases outgrown their usefulness, due to the fact that they are not capable of producing a sufficient degree of purification, and the time is ripe when other and more efficient methods must be considered to supplement chemical precipitation works if the latter are to be used at all. Thus, at Worcester, Mass., several acres of sand beds have been built by which to further purify the effluent of the chemical precipitation works. In New England, generally speaking, sufficient areas of porous land (glacial drift formation) are available, so that the cheapest and best method of sewage purification is afforded by the application of the sewage to land for short periods at a time, between which the land is thoroughly cleansed by the entrance of air. This is called intermittent filtration.

There are two aspects to the problems of sewage disposal. One refers to conditions when it becomes necessary to purify the sewage so as to protect the body of water into which it is discharged, if this is to be used for drinking purposes farther down stream. The other relates to the prevention of over-polluted bodies of water to a degree that results in nuisances from bad odors. In Massachusetts the first of these aspects of the problem of sewage disposal has been developed further than elsewhere in America. Intermittent sand filters have been adopted in numerous cases to purify the sewage with sufficient thoroughness so that the streams into which the filtered sewage is discharged may be used for drinking purposes after some additional treatment. Thus the sewage of the small cities and towns of Natick, Framingham, Marlboro and Westboro is purified nominally to protect the water supply of the city of Boston, and also the brooks themselves into which the effluent is discharged.

The prevailing method of sewage disposal in America is by a sufficient dilution in the most convenient watercourse. Seaboard cities find this method to be generally satisfactory, particularly if the sewage is first carefully screened so as to free it from those particles which would float and be unsightly. Some inland cities on lakes and large rivers can also dispose of their sewage in this manner satisfactorily for some time yet, but there are others where more or less trouble results at times of low stream flow, and these troubles are bound to increase as the cities grow in size. Many of them are gradually shaping things somewhat toward the ultimate adoption of some form of sewage treatment works, but generally the expense is so great that material progress is slow, and it may perhaps only be accelerated by the action of the courts.

Sewage purification works require a continual municipal expense which usually results in comparatively little benefit to those who have to bear it. Accordingly, where land treatment is not available, cities are anxiously awaiting the results of new methods by which the cost of works of artificial construction will be lessened as compared with those of earlier designs. This is true not only in America but also in Europe, where improvements are needed in many cases.

Accordingly, a few years ago much was heard by the sanitary engineer of this country concerning the merits of the so-called septic process and of contact beds made of coke or broken stone, which procedures have been much studied in England since 1895. More recently still other methods have been proposed and much discussed in both England and our country. They are the activated sludge process which was very extensively investigated in Milwaukee and the Miles acid process tested in New England. The former is a process requiring a very thorough settling and aëration of the sewage. The result is a very clear and inoffensive effluent on the one hand and a concentrated but odorous sludge on the other, which can be converted into a good fertilizer. The Miles acid process is designed to extract grease from sewage, by adding sulphuric or sulphurous acid to precipitate the solids and by degreasing the resulting sludge.

All these methods are more or less intimately associated with biological processes by which the bacteria convert putrescible organic matter into harmless and stable mineral matter. While these processes are not so effective or economical as was at first claimed for them, they have merit and are worthy of careful consideration, where other methods are found more expensive or are impracticable. The disposal of liquid trade wastes is becoming an important factor in some of the industrial centres, and this problem is one which in future years is bound to come more and more within the attention of the sanitary engineer.

Generally speaking, the sewage disposal methods should consist of means (1) to remove the objectionable floating matter; (2) to let the solids readily settle; (3) to treat the liquid freed from floating and solid matter, so that it will be oxidized and become inoffensive. The first method may be accomplished by screens, also scum boards. The second by settling basins and tanks. Grit is deposited when the velocity slows down to less than 12 inches per second, and can be collected in small basins. Lighter matter will settle when the velocity is not over a very few inches per second. Large basins are required for this purpose, the size depending upon the quantity of suspended matter thus to be removed. The third method requires the oxidation of the liquid. This is accomplished by a discharge into a running stream of which the minimum flow is sufficient for the required oxidation (dilution). It is also accomplished by a percolating through porous material. If it is sand the percolation is slow and a high degree of oxidation is secured (intermittent filtration). If it is broken stone of egg size and the sewage is sprinkled over it the percolation is more rapid and the oxidation is not as great (trickling filters), but is sufficient for many cases, particularly where a subsequent dilution in a sufficiently large stream can be given. Oxidation can also be accomplished by allowing the sewage to be in contact with the sides of broken stone for several hours and then discharged (contact beds). Here the oxidation is also not complete and usually requires subsequent dilution or sand filtration of the effluent.

The disposal of the floating matter is generally done, first by pressing and then by burning in a furnace. The disposal of the grit is generally by washing and then dumping. The disposal of the finer sediment forming sludge is less simple. The sludge from septic or single tanks has usually been dumped in shallow layers over prepared areas and dried. It is quite offensive until dry. The sludge from Imhoff or double-deck tanks is kept quietly under water and separated from the flowing sewage. This permits a decomposition that is not septic, the gases evolved being almost wholly carbon dioxide and methane. After several months the sludge is sufficiently decomposed so that it can be withdrawn, inoffensively dried and used as a garden soil which it resembles.

3. Refuse Collection and Disposal.—Another branch of municipal works to which the attention of the sanitary engineer is beginning to be drawn is the cleaning of streets and the disposal of garbage and other municipal wastes which cannot be removed by water carriage in underground channels. They include ashes, street sweepings, dry rubbish and kitchen garbage, all of which require collection by special cartage. In small communities the disposal of this refuse is not very difficult or expensive, but in the large cities it is frequently a perplexing and expensive undertaking. It is also an important sanitary matter, as disease, bad odors and general discomfort result from improper and ineffective attention to these matters.

Street cleaning in this country has not yet been developed to the standards of western Europe, which is due to their better methods of city government. The conditions for clean streets are, first, a firm and fairly smooth pavement; secondly, a well-trained and permanent force of cleaners and flushers; and, thirdly, a systematic and frequent sweeping, and, where practicable, also a flushing to remove the dust which cannot otherwise be thoroughly removed.

The refuse originating in the houses consists of garbage, ashes and rubbish. It is necessary to educate the people to a proper house treatment to prevent unsanitary conditions and to suit the method of collection which the city has established. This may be a combined or separate collection. If it is combined then all refuse is dumped at the house into the same receptacle or can and thus collected. If it is separate, then the refuse is generally and best separated into three parts — garbage, rubbish and ashes. Each material is put into a separate can and collected at different periods. Garbage, because it rapidly putrefies, should be collected daily or at least every two days in summer, and in winter at least twice weekly. Rubbish and ashes are collected weekly or monthly as deemed best. All vehicles should be specially designed to prevent any nuisance from leakage, dust or odors. The collectors should be well trained to perform their specific duties and to thoroughly know their territory.

The disposal of refuse differs according to local conditions. It should first be sanitary and second economical. Sanitary engineering can now provide the solutions. In Europe the usual custom is a combined collection and a disposal by incineration. In America this is practised in some of our cities. In most of them a separate collection has been found to be more economical. The reason is that we discard and throw into the refuse much material which is utilized in European houses. The rejected matter when collected in large quantities may be utilized at a profit. Fresh garbage from American hotels and residences furnishes an excellent food for hogs and is valuable for this purpose. Many small cities in the United States and some large ones (Baltimore) are now adopting this method of disposal. Where it cannot be collected fresh enough for feeding it can be subjected to a treatment with heat and naphtha so that it yields a paying quantity of grease and of fertilizer filler. This process is called reduction and is employed in most of the large cities of this country, from New York down. The war has caused a greater economy in the use of food and, therefore, a serious reduction of wasted grease, so that most of the reduction works have lately been working at a great disadvantage.

Picking over the rejected matter at suitable establishments has also been practised in Europe as well as here. But in Europe it has almost entirely been given up, as the profit was small and the danger of disease propagation was feared. In our country picking is still practised in a few cities.

Incineration, used extensively in Europe, is also gaining in practice here. The general rubbish from houses, when it cannot be safely dumped to fill low places, is best disposed of by burning. It is the safest solution from a sanitary point of view and its destruction by fire is also generally the cheapest method if steam can be produced and used. It has been attempted to destroy also garbage in furnaces. While this may be a satisfactory sanitary disposal, it requires the addition of fuel, is therefore expensive and consequently the process is shirked. The temperature even when destroying organic matter is too low to produce steam. Better success has been had by burning garbage and rubbish together. The best success in Europe has been gained by adding also the discarded ashes, which in England contain about 25 per cent of unburnt coal.

In Europe and in some of our cities the incinerators have developed temperatures sufficient to produce steam, which is more or less utilized. In Hamburg and a few other cities the steam produced not only operates the plant, but is converted into electric power through storage batteries for wagons collecting the refuse. In all plants their required power and lighting is obtained from the incineration of refuse.

Shallow burial of garbage has also been practised with more or less success in forming productive soil, notably in Berlin, Germany. In our country the conditions are in many cases so different from Europe and even in the various parts of our country, that only a careful

study by competent engineers can reveal the best method, where the sanitary conditions are obtained at the least cost.

Speaking generally, the accomplishments in sanitary engineering in America since 1875 have been marked by furnishing cities and towns with good water supplies and with efficient sewers and drainage, and some have also plants for refuse disposal. Improvements in this line began at a later date here than abroad, and in many ways the Europeans are still in advance as regards the carrying out of the well-established principles of this subject, although the contributions and experiences of Americans have added much to its general knowledge, especially as applied to the specific conditions here existing. In no field of civil engineering does there appear a more promising opening for study and practical activity than in the sanitary branch. See also SANITARY SCIENCE.

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SANITARY SCIENCE. The term sanitary science is conveniently employed to cover that body of precise, correlated and organized knowledge which has to do with health, and especially such part of that knowledge as deals with the *environment* rather than the individual person. It is one of the inductive sciences like physics, chemistry and biology, of which last it is a subdivision. Like the other inductive sciences it depends upon observation, generalization and verification, and includes a body of established doctrines which have been reached by these processes. From the etymological point of view sanitary science is literally the science of health, and is, therefore, strictly speaking, equivalent to hygiene. Until quite recently, however, the term sanitary science was used in Great Britain largely to the exclusion of the term hygiene, while on the Continent the reverse was and still is the case. The present tendency in America appears to be to employ both terms, with somewhat special meaning attached to each; although the fact that large numbers of medical and scientific men have brought home with them from Germany the term «hygiene» is unquestionably having its influence in favor of this term in America as well as in Great Britain. The probability is that for the next few years at least both terms will be used, perhaps somewhat indiscriminately, sanitary science and sanitation being applied to the more familiar and more practical aspects of hygiene, such as water supply, milk supply and food inspection, and especially to its more engineering aspects; the term hygiene being more often reserved for the less familiar and especially for the more medical and physiological aspects of the science of health.

Definitions.— In point of fact there is today a real and practically important distinction between the two terms. Hygiene in its broadest aspect undoubtedly includes everything relating to health and covers, therefore, both personal and public hygiene. Of late years, however, with the development of its engineering aspects (sanitation) on the one hand, and its physiological aspects (especially serum therapy) on the other, there has come about a real and practical differentiation between hygiene and sanitation, the former being largely in the hands of physicians, the latter largely in the hands of sanitary engineers. This differentiation has furthermore a sound biological basis; for if we regard health as the normal operation of the human mechanism and disease as its abnormal operation, then it is easy to see how some diseases may be warded off by increasing the efficiency (and especially the vital resistance) of that mechanism, while others may be prevented by an adequate control of the environment. Smallpox, for example, may be warded off by vaccination, a purely physiological or medical, and, therefore, on our classification «hygienic» process, but not by mere sanitation. Typhoid fever, on the other hand, was formerly prevented chiefly by proper control of the environment — for example, by the purification of water supplies, the purification of sewage and the protection of the purity of food supplies such as milk and oysters, these being «sanitary» procedures dealing directly with the environment, and only indirectly with the individual or person. To-day, however, it is also and very efficiently prevented by «vaccination» with a serum made from dead bacilli of the same disease. We may still advantageously employ both terms, namely, hygiene and sanitation (the basis of which latter is sanitary science), keeping hygiene more particularly for procedures directly affecting or dealing with the bodies of the people themselves and sanitation for procedures dealing directly with the environment and only indirectly with the human mechanism. If, however, the term hygiene be preferred for the whole subject, then obviously the engineering, environmental or «sanitation» aspects of it fall under the subdivision «public hygiene» or «public health,» and the remainder under «personal hygiene» or personal health. See PUBLIC HEALTH; HYGIENE, etc.

It is important at the outset to form ideas as clear and definite as possible of the nature of health and disease, terms which though constantly used are often but little understood. We shall probably not go far wrong if we accept the dictum of Huxley that "the characteristic of modern as contrasted with ancient physiology is the conception of the human body as a physical mechanism" and regard the latter as an intricate piece of machinery subject to all the conditions and limitations to which any machine is exposed. If around this essentially mechanical view of the human body we throw that other modern conception, the «environment,» that is to say, if we picture to ourselves the human body as a mechanism not only deriving energy from its environment and doing mechanical and other forms of work, but giving back to the environment heat and waste products (an idea which lies at the very basis of modern physiology), we shall readily arrive at a clear, consistent and helpful conception of the human mechanism and its workings, from which we can readily pass on to clear and logical ideas of health and disease. For in that case we have only to think of the body as a piece of mechanism with all its parts in good working order, or, in other words, sound, normal and whole, and working in a favorable environment, and to this condition to apply the term *health*. Conversely we may regard any condition of the mechanism in which one or more of its parts (organs) is seriously out of order, unsound or abnormal, or working under unfavorable conditions, as a condition of disease. In the normal, sound or healthful condition the parts of the organism work together with ease, but in the unsound or abnormal condition this may not be the case and «dis-ease» may be the result. In short, the word health (related to the modern word *hale,* Old English *hole*) actually means hale-ness or whole-ness, in which form it appears for example in the Scriptural phrase "They that be whole need not a physician."

Health and Disease.— Sanitary science then regards health and disease very much as biology regards life, as a special state or condition, and the essential basis of health as sound and proper construction and operation of the human mechanism under favorable conditions. The sources of health are plain. They are obviously good timber, good construction and wise operation or management of the human mechanism, to which we must add favorable external surroundings or environment. In so far as sound and normal, or unsound and abnormal, mechanisms are inherited, they are clearly for the most part beyond the control of sanitation and hygiene, but in so far as health and disease are dependent upon good care, management or operation, and especially in so far as they are dependent upon favorable external conditions or environment, they are obviously to a greater or less extent subject to our influence and control; and herein lies the broad and practical field of the applications of sanitary science. If, for example, observation and experience have established the fact that certain trades are more than usually dangerous, then it is the privilege and the duty of the professors of sanitary science to verify and make known these facts. If it can be shown that certain climates are destructive of health and of life, while other climates conduce to good health and longevity, then it is the duty of students of sanitary science to establish and proclaim these facts. If, as appears from the results of innumerable investigations to be true, polluted water and polluted milk are apt to convey the germs of typhoid fever, these facts may be verified, made known and acted upon.

For the purposes of sanitary science diseases may be roughly classified into two grand divisions, namely, (*a*) those which are due to defects of material or construction or operation and may hence be described as *constitutional,* and (*b*) those which proceed more directly from external sources and are plainly due to mechanical injuries, parasites, poisons or other external or *environmental* conditions. These last the sanitarian may hope in part at least to control, while the former, being largely hereditary, are for the most part beyond his reach. It should not, however, be overlooked that the materials and construction of the mechanism may suffer damage from the action of slight or long-continued external influences, or that some so-called «constitutional» diseases may be really environmental in origin.

Causes of Disease.— Turning now to the obvious external causes of disease, with which in this article we shall chiefly deal, we may quickly dispose of those which are plainly chemical, mechanical or physical (burning, crushing, freezing, gunshot wounds, dagger thrusts, earthquakes, lightning and the like), of obvious external origin and preventable only by removing or avoiding the cause. In the same way we may set aside deaths by drowning or execution (hanging, electrocuting, etc.), and even suicide in so far as this is produced by external conditions such as loss of friends, loss of property, etc., and not from internal or constitutional defects or changes. Another group of obvious external causes of disease is that series of phenomena which comes under the head of *poisons* coming in or acting from the environment, such as arsenic, strychnine, morphine, nicotine, caffeine, chloral, alcohol, cocaine, etc. Disturbances of the mechanism due to the entrance of these essentially foreign bodies are only too familiar and are obviously readily preventable by removing or avoiding the cause. There still remains to be dealt with, however, one great class of external causes which may be roughly grouped together under the head of living agents of disease or parasites; including in this term not merely the coarser and more obvious parasites such as tapeworms, fleas, lice, mosquitoes and trichinæ, but also those far more elusive and dangerous micro-organisms, the microbes, bacteria or disease-germs. Some of these are dealt with elsewhere (see BACTERIA; HOOKWORM ANATOMY AND LIFE HISTORY; MOSQUITO; PARASITES; TRICHINA; TAPEWORM; etc), but with the relations of these parasites (and more especially of the microbes) to the health of individuals and of communities we have still to deal.

The Germ Theory.— One of the most fruitful discoveries of the 19th century was the fact that some diseases of previously unknown origin, such as some of the more common fevers — typhoid fever, diphtheria, Asiatic cholera and tuberculosis — are due to the entrance into the body from the environment of certain micro-parasites, microbes or micro-organisms. When to this discovery was added another, namely, that these micro-parasites are capable of living for longer or shorter periods outside of the bodies of plants and animals, in the environment of man, and especially in earth, air, water, milk and other materials intimately associated with human life, it became easy to understand, what had up to that time been an insoluble mystery, not only how certain diseases are caused, but also how they are spread among the people and, at the same time, how they may be controlled and even overcome. The whole problem of the prevention, not only of individual cases of disease but of those wholesale attacks of disease upon communities which had long been known as epidemics, plagues and pestilences, now became possible of solution, and one of the most promising fields for the improvement of the health of communities as well as of individuals in the 20th century lies in a complete elucidation, along the lines thus marked out, of the precise methods by which diseases are caused and conveyed, and consequently how they may be prevented. To this end not only further knowledge is required, but also an education of the people at large in the elements of sanitary science, so that diseases anywhere arising may be restricted as nearly as possible to their places of origin and there by the arts of disinfection blotted out and exterminated. Once the principle has been clearly recognized that there exists a large class of diseases (known as the infectious and contagious diseases) all of which are probably due to the entrance into the bodies of animals or plants of living external agents, called germs, mi-

crobes, micro-organisms or micro-parasites, together with the additional fact that these germs or micro-organisms, microbes, micro-organisms or micro-parasites find their way from person to person either directly («contagion») or indirectly in devious ways through the environment («infection»)—it becomes a fascinating study to detect and discover the precise routes by which infection and contagion travel; the material vehicles by which the germs in question are conveyed; the conditions of their «longevity» or endurance in the environment under various conditions; their resistance to agents of destruction, such as cold, heat, acids, alkalis and other disinfectants; their distribution from person to person, from community to community, and sometimes even from nation to nation, as they move in or are carried about by water, milk or other food materials; by insects such as flies, fleas and mosquitoes; by wind in the form of dust; by emigrants traveling from country to country; by letters through the post-office; and by linen through laundries, sweatshops, clothing houses or other like establishments.

Owing to the obscurity pertaining to most epidemics, plagues and pestilences, strange and unusual phenomena were formerly associated with them as causes. Terms such as «miasms,» «effluvia,» «telluric influences,» and «formites,» were commonly used to describe causes of disease not very many years ago, but to-day these have practically disappeared. As a result of the new points of view described in the foregoing paragraphs, infection and contagion are no longer regarded as obscure, mysterious influences, such as strange atmospheric conditions, earthy exhalations or intangible gaseous emanations from swamps or forests, but rather as due to the aggressive activity of specific organisms entering the body and causing within it definite and peculiar alterations. Like bullets, daggers, slivers and other extraneous bodies coming from the environment, these are material, tangible and recognizable causes of disease, natural rather than supernatural, and simply microscopic rather than macroscopic.

The search for the agents of disease had not, however, continued long before it began to be recognized that the invasion of the body by germs of whatever sort is, to all intents and purposes, an attack upon it by parasites, and once this became clear it was evident that, as in other cases of parasitism, the process is essentially a struggle between the invading parasite upon the one hand and the resisting organism on the other. We now know that the process by no means consists of an active attack upon a passive subject, but is rather a battle or a struggle between host and parasite (for example, between man and microbe), in which the physical or physiological conditions of the host tend on the one hand to overcome and destroy the parasite; while the parasite on the other attacks and injures the host in various ways, often by mechanical injury of tissue and sometimes by the excretion in the course of its own vital activity of products essentially poisonous or *toxic* to the host. In the case of diphtheria, for example, the diphtheria bacillus first invades the throat of its «host» or victim and, having established itself there, feeds and multiplies upon the surface-layers of the epithelium, producing meantime a violent poison known as the «toxin» of diphtheria, which substance so damages the cells of the host in the vicinity as to allow a free exudation of lymph, and this, quickly coagulating, produces the white patches of the throat characteristic of this disease. But this is not all. Some of the toxin is also absorbed into the general circulation of the host and produces fever and other general constitutional symptoms of a grave character. Meantime the tissues of a strong and healthy host actively produce what are known as «antibodies» or «antitoxin,» a substance capable of neutralizing the toxin either in the body itself or even in a test-tube; and it is owing to the possibility of causing some of the lower animals, especially horses, to be habituated to the diphtheria toxin, and to produce antitoxin in their blood that we have been enabled to secure from these animals this beneficent remedy for use in cases of diphtheria in human beings. In consequence of discoveries of this sort a field of splendid promise has been opened up for 20th century hygienists, along the lines of *serum-therapy* (as it is called), that is to say, the production of various blood serums rich in antidotes for the poisons generated by the microbes of specific diseases. See ANTITOXINS; IMMUNITY; SERUM-THERAPY; TOXINS AND ANTITOXINS; VACCINATION.

Parallel with preventive medicine we have to-day preventive hygiene and preventive sanitation—the first being essentially a modification of the body by medicines such as serums and vaccines; the second its modification by exercise, play, diet and the like; and the third the prevention of disease by control, not of the body but of the environment.

Practical hygiene and sanitation may obviously proceed along either of the two lines indicated, namely (*a*) reinforcement of the organism in its struggle with infectious microbes, or (*b*) exclusion of the microbes and their destruction in the environment. The latter is commonly known as «sanitation.» It deals rather with the control of the environment than with that of the human mechanism, and it is, therefore, largely connected with problems of sanitary engineering. See HYGIENE; PUBLIC HEALTH; SANITARY ENGINEERING.

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SANKHYA, sän'khyą, the name of a philosophical system of ancient India. It is attributed to a writer by the name of Kapila, about whom we know absolutely nothing. While the extant texts do not date back much further than A.D. 1380 Sānkhya writings are known to have been translated into Chinese in the 6th century, and the inception of the school is probably considerably earlier. The philosophy is strictly a dualism, and indeed the name of the school may be translated as «pluralistic.» The *Prakriti,* or matter of the universe, is opposed to the *Purushas,* or souls, of which there are an unlimited number. The *Prakriti* assumes eight forms and 16 modifications. That deliverance from continual rebirth which constitutes the goal of all Indian philosophy is attained, according to the Sankhya school, by a complete knowledge of the soul principle and of the 24 modifications of matter. This deliverance consists in the separation of the soul principle from its pain-giving material environment. The material world has a certain history determined by its very nature. It is tripartite, consisting of goodness, darkness and passion. These were primitively in an equilibrium which gradually becomes upset until a new equilibrium is formed and a new universe. Without the intervention of the *Purusha,* the *Prakriti* develops within itself a world-intelligence. This generates consciousness, which by a gradual process of degradation gives rise to the cruder matter forming the object of our experience. Thus the entire psychical life, in so far as it may be analyzed and expressed in discourse, is derived from the matter constituent of the universe rather than from the soul constituent. The method in accordance with which the individual soul comes into contact with a particular part of the material universe is by no means clear. In whatever context it occurs, the soul is unmoved by emotion, without will, and entirely absorbed in a cognition which has no object. Notwithstanding its inactivity, it stimulates the material body-consciousness complex into will, emotion and the knowledge of definite objects. Since to the Indian mind the notion of consciousness is inseparable from that of pain, the union of soul and body in life is by its very nature painful, so that the purpose of philosophy is to interrupt the continual imprisonment of the soul in one body after another. As has been said, the Sānkhya philosophy maintains that when the distinction between the psychical and the material is clearly envisaged throughout the universe, this distinction becomes a real distinction as well as a conscious one, and the soul lapses into the unconsciousness of a trance.

It will be seen that the Sānkhya philosophy gives an explanation of the world-processes which conforms rather to the mechanical than to the teleological type. Accordingly, this school has no need for the *Deus ex machina* employed by the other doctrines of India. It is therefore known as 'the atheistic doctrine.' The Yoga philosophy (q.v.) differs from the Sānkhya in little but the belief in a Deity. Consult Ballantyne's translation of the *Sānkhya-pravachana* of Kapila; Davies' translation of the *Sānkhya-kārikā* of Īsvarakrihna; Grabe, R., 'Sānkhya Philosophie' (Leipzig 1894); id, 'Sānkhya und Yoga' (Strassburg 1896); Saint Hilaire, B., 'Mémoire sur le Sānkhya' (Paris 1852); Roer, E., 'Lecture on the Sānkhya Philosophy' (Calcutta 1854).

SANNAZARO, sän-näd-zä'rō, **Jacopo,** Italian poet and epigrammatist, descendant of a noble family of Spanish origin: b. Naples, 28 July 1458; d. there, 27 April 1530. After study under Pontanus, he was admitted to the Arcadian Academy as ACTIUS SYNCERUS, the name he selected to be known by, according to the prevailing custom. He spent several years in foreign travel and on his return to Naples soon became famous as a poet and courtier. His verse attracted the attention of King Ferdinand and his sons Alphonso and Frederick. The last named when he ascended the throne as Frederick III in 1496 gave him the villa of Mergellina with a pension of 600 ducats. In 1501, when Frederick was forced into exile by Louis XII, Sannazaro accompanied him and remained with him until his death in 1504. During this period he completed his famous 'Arcadia,' a pastoral poem published in 1504, which passed through 60 editions before the close of the 16th century, and was largely imitated. His subsequent works include 'De partu Virginis' (1526), a Latin poem which carned him the title of the «Christian Virgil»; and his collected 'Sonetti e canzoni' (1530). His elegance of expression, no less than the poetical beauty of his thoughts, give him a distinguished place among the Latin poets of the Renaissance, and despite some adverse criticism, his 'Arcadia' still retains its reputation. See ARCADIA. Consult Colangelo, 'Vita di Jacopo Sannazaro' (Naples 1819); Carrara, E., 'La poesia pastorale' in 'Storia dei generi letterari italiani' (Milan 1908); Scherillo, M., 'Arcadia di Jacopo Sannazaro' (Turin 1888).

SANSEVIERIA, sän"sĕv-ī-ē'rī-a, a genus of plants of the family *Liliaceæ,* of tropical Africa and the East Indies, named in honor of the Prince of Sanseviero, a Neapolitan. It includes tender foliage plants useful in window gardening, since much sunshine is not necessary for their welfare, and they are easily propagated by division or leaf cuttings. The sansevierias have thick rootstocks, bearing tufts or rosettes of rigid, sometimes stem-like leaves, from one to four feet long; and, in the species cultivated in America these are sword-shaped, terete or oblanceolate, dark-green and banded more or less with grayish-white. The flowers have long and slender perianths, are white, and clustered among dry bracts in a dense raceme, rising from the centre of the group of leaves on a tall naked stalk. Bowstring hemp, used in India, is the long, durable fibre, also called Moorva and Marool, which is obtained from the East Indians *zeylanica.*

SANSKRIT is the literary high speech of India from the beginning of its historical tradition to the present day. A dozen or more languages or linguistic groups (Iranian, Greek, Italic, Celtic, Teutonic, Balto-Slavic, etc.), in close relation with Sanskrit, constitute the so-called Indo-European family of languages. Of these Sanskrit is the oldest and best preserved member. Together with the Iranian (Persian) and Scythian, it makes up the Aryan subdivision of the Indo-European family. This is the settled, scientific use of the term Aryan; but Aryan is widely and confusingly used in popular writings as the equivalent of Indo-European.

Certain cuneiform inscriptions of Western Asia (Mitani and Hittite) exhibit proper names which are clearly Aryan. They are dated at about 1500 B.C. The date at which Aryan clans began the occupation of Hindustan is unknown, but may for inner reasons be assumed to be no later than 1500 B.C. From that time on to the present day, that is, during a period of roundly 3,500 years, some form of Sanskrit has been the main instrument of Hindu literary, religious or cultural expression.

The name Sanskrit is used in a double sense, one general, the other more particular. In its

general sense it refers to the entire history of the highest speech form of India, beginning with the earliest period of the religious hymns of the Veda, to the present day. In this sense it is to be compared with Latin in which the language of the 12 tables, of Plautus, Livy, Saint Augustine, or Thomas Aquinas represents, in spite of much change, phases of one and the same language. In this sense, too, Sanskrit is contrasted with "Middle-Indic," the so-called Prākrit dialects (Pāli and Prākrit), which represents a secondary speech development, closely analogous to that of the Romance languages out of Latin. Like Romance, Prākrit, in distinction from all forms of Sanskrit, represents popular languages, differing considerably from one another according to time and place; like Romance, Prākrit shows extensive phonetic and morphological changes, often curiously alike in the two fields; and like Romance, Prākrit dialects, such as Pāli (the language of the canon of the Southern Buddhists); the Prākrit used by the sect of the Jainas; the Māhārāṣṭrī, etc., attained in various periods the character of literary languages. Middle-Indic appears for the first time in the earliest Hindu inscriptions, namely those of the famous Buddhist Emperor Açoka, in the middle of the 3d century B.C., where these dialects show themselves in already differentiated forms. About 1,500 years later the Middle-Indic dialects develop into the modern languages of India, such as Hindi, Bengali, Penjabi, Guzarati, Marathi, etc., some of which in their turn, blossom out into literary languages of no mean quality. Thus Sanskrit as a whole holds the position of mother to the Middle-Indic, grandmother to the modern languages of India.

But the term Sanskrit is used also in a narrower, technically more correct sense. The early language of the Veda does not, curiously enough, designate itself by any name. The grammarians of the classical language speak of the sacred Vedic language as chandas, "metre," referring to the metrical Vedic hymns, and constrasting that language with the later language of secular literature as bhāsā "speech." Now this sacred language is practically restricted to the books of the Veda; it is therefore spoken of either as Vedic, or hybridly, as Vedic Sanskrit. The term Sanskrit does not appear until after the time of the great Epic (Mahābhārata). It is an academic term coined by the grammarians (Pāṇini and his followers), whose activity ended in the 2d century B.C., for the language of the classical and secular literature which developed after the time of the Epic. The term saṃ-skṛta means "formed," and refers, strictly speaking, to the grammatical processes assumed to underlie the formation of words (saṃ-skāra). Yet the language of the Epic and other post-Vedic literature, such as the 'Polity Book' (Arthaçāstra) of Kautilya or Cānakya, written about 300 B.C., are so close to the Sanskrit of the grammarians, as properly to be included in that term. This then is what is called Classical Sanskrit, or Sanskrit for short. For more than 2,200 years, until the present day, Sanskrit has always led a more or less artificial life, and has always been encroached upon by more popular speech forms descended from it (Prākrits and modern languages). Nevertheless, it has during all that time dominated the culture of India, and remained its paramount expression in literature. Even at the present time Sanskrit is not quite a dead language in the sense in which Latin is a dead language among scholars or clerics; or Hebrew a dead language with the Jewish Rabbis. More spontaneously and extensively Hindu pandits, kings and ministers still speak or hold learned disputations in that language, or compose good Sanskrit poetry and prose. And there is plenty of evidence that in earlier times, say around 1000 A.D., Sanskrit was not only spoken by literary and scientific men, but was spoken or understood widely by cultivated people, both men and women. The grammarian Pāṇini states rules for Sanskrit which can apply only to spoken language, and the grammarians in general testify to dialectic differences in the Sanskrit of different parts of India which, again, means spoken language. In the second half of the 11th century the poet Bilhana tells that in the capital of his native Kashmir even women could speak both Sanskrit and Prākrit. Other writers present the same similar testimony. In the Sanskrit drama men of superior station: kings, ministers, generals and Brahmans, speak Sanskrit; the rest of the men and the women, Prākrit, making the dialogue bilingual. Those who did not themselves speak Sanskrit must, therefore, at least have understood it.

Though Sanskrit in the broader sense of the highest speech of India is a single language from the beginning to the end it by no means passes through its long history of about 3,500 years without change. The language of the Vedic hymns differs from classical Sanskrit about as much as the Greek of Homer does from Attic Greek. The apparatus of Vedic grammatical forms is richer and less definitely fixed than that of classical Sanskrit, which has given up many forms of the earlier language, without, as a rule, supplying proper substitutes. The subjunctive is lost; a single infinitive takes the place of about a dozen very interesting Vedic infinitives. Classical Sanskrit also has given up the most important single heirloom which it brought with it from prehistoric times, namely, the Vedic system of accentuation, which in classical times is swept off by a totally new mode. For all that Vedic, though at most points richer in form and less settled in character, is not a popular dialect, but a more or less artificial high speech handed down by generations of priestly bards. Thus both Vedic and classical Sanskrit are languages adapted to literary use by the cultured classes of their respective times. But the extent and conscious purpose of that regulation differs widely in the two phases; the handling of classical Sanskrit by Pāṇini and his followers went beyond any academic attempt to regulate speech recorded in the history of civilization.

An older linguistic time, lying behind the Veda, is still quasi-historical, though it can be reconstructed only by the aid of comparative philology. The Vedic people were immigrants to and conquerors of India; they came from the great Iranian region that stretches from the other side of the Himālaya Mountains almost as far as the Mediterranean. The comparison of Vedic (and to a lesser extent Sanskrit) with the oldest records of Iranian speech, the Avesta, and the cuneiform inscriptions of the Achemenidan Persian kings, yields the startling result that these languages are collectively mere dialects of the same older idiom. This is known as the Aryan or Indo-Iranian. The reconstructed Aryan language differs less from the language of the Veda than Classical Sanskrit does from Pāli and Prākrit. The language of the Avesta is so much like that of the Veda that entire passages of Avestan may be converted into good specimens of Vedic by merely eliminating the special sound changes which Avestan has evolved in the period of its separate existence. And the literary style, the metres, and above all the names of the mythologic persons in Veda and Avesta are enough the same to make the study of either to some extent dependent upon the other. In fact the spiritual monuments of the Avesta as well as the stone monuments of the Achemenidan kings became intelligible chiefly by the aid of Sanskrit.

The Sanskrit language regarded by itself is the most important and most highly organized of human languages. In verb inflection, for instance, it shows a larger number of categories than any other; there are some 14 varieties of expressing various shades of continuous verb kind (the so-called "present-systems"); it has imperfect, perfects, more than half a dozen aorists, futures; it has indicative, subjunctive, injunctive, optative and other mode classes; it has active, middle and passive voices. The so-called secondary verb kinds are abundant in variety and indefinitely productive; intensive, causative, desiderative and denominative. In the noun it shows seven cases and a wealth of differentiated noun stems unequaled by any other language.

From the comparative point of view Sanskrit is the oldest sister (not the mother) in the Indo-European family of languages, the most widespread, the most enduring, and historically the most important family of languages. Since the revival of classical learning there has been no event in the history of culture as important as the discovery of Sanskrit in the latter part of the 18th century. There is at present no domain of historic or linguistic science untouched by the influence of Sanskrit studies. The study of this language opened up the primitive Indo-European period, and originated the science of comparative philology in all its bearings. Linguistic science, comparative grammar, comparative mythology, science of religion, comparative jurisprudence and other fields of historical or philosophical study, either owe their very existence to the discovery of Sanskrit, or were profoundly influenced by its study. See LANGUAGE, SCIENCE OF; PALI LANGUAGE AND LITERATURE; PRAKRIT; RIG VEDA; VEDIC LITERATURE.

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SANSKRIT LITERATURE.

Sanskrit is the Anglicized form of *saṁskṛtā* (from *sam*, a preposition of intensifying force in compounds, and the root *kr* "to make," cognate with Latin *creare*, "the adorned" or "perfected," that is, "speech"). It is employed to designate the second period in the literary development of the Aryans in India. For the first period, see VEDIC.

Distinction of the Two Periods.— The difference between Vedic and Sanskrit literature is not merely one of time, but extends to matter, spirit and form. The literature of the first period is religious, that of the second in spite of a marked tendency to moralize is profane. The purpose of the first period is practical, its primary object being to obtain happiness in this world. The second period in consequence of the doctrine of transmigration is filled with the idea of the misery of all existence, and its purpose is artistic, to satisfy an intellectual want. As the literature of the first period was practical, a natural prose style had been developed in the Brāhmanas. The artistic purpose of the second period led to the almost total abandonment of prose in favor of verse, often to the detriment of subjects requiring exact treatment, for example, the law. Prose when employed is either mingled with verse as in parts of the epic, the drama, fairy tales and beast fables; or so artificial as in the kāvyas or prose romances, that conform to the rules of poetics; or so awkward and obscure, as in the grammatical and philosophic treatises, as to be hardly worthy of being called prose.

Striking as these differences are, they are in reality less important than the less obvious changes that have taken place in the language. Hence it is quite appropriate that, while the first period is named from its literature, the second is named from its language — the Sanskrit.

Development of the Language.— The difference between the language of literature and that of everyday life is always of cardinal importance, but nowhere is it more strongly marked than in India. That it existed even at the time of the composition of the hymns of the Rig Veda is unquestionable. The language in which the "hieratic" hymns are composed is no spoken language, but an artificial dialect that was transmitted from generation to generation in the families of the priestly singers. This is shown by the fact, that in spite of varying authorship, there is nothing like dialectic variation within this class of hymns. It is evidenced also by the way in which forms of different periods appear side by side; by the unthinking repetition of phrases; by incorrect uses of words and forms; by false formations and by the way in which the necessities of the metre are allowed to determine the choice of synonymous forms. The language of the priests themselves may have approximated to this type with the omission of the most archaic and poetic elements; but the language of the masses of the people must have been very different. Positive proof of this is afforded by the fact that some words in the Rig Veda show already the phonetic peculiarities that are characteristic of the mediæval dialects. Such words must have originated in the language of the lower classes and thence made their way into the literary language. They show that the language of the lower classes had already advanced far in its development. The differences between this hieratic type of language and that of the popular hymns have generally been interpreted as due to differences in time; and attempts have been made to assign the different hymns to different periods on this basis. It has recently been shown, however, that the forms that have

been considered evidences of later date are frequently prehistoric and hence, certainly, as old if not older than the forms of the hieratic language; and that the language of the popular hymns is not a continuation of the language of the hieratic hymns, but that we have in these types parallel dialects, whether their difference be geographical or, as seems more probable, due to their employment by different social strata. The language of the Brāhmaṇas and Sūtras again is a continuation of neither of these types, but must be considered as an adaptation to literary purposes of the language spoken by the Brahmans at the time and place of their composition, under the influence of the literature that already existed.

Finally, there was fixed in the grammar of Pāṇini a type of language closely related to that of the Sūtras. This eminent grammarian from the northwestern part of India, whose date may be assigned to the 4th century B.C., represents the culmination of the grammatical studies that had their beginnings in the Brāhmaṇas. Of predecessors he mentioned no less than 64; but the success of his grammar has led to the disappearance of their works. His grammar became the standard for the classic language so absolutely, that from this time the language is fixed— there being no further development of language but only of style. This language is called the Sanskrit, that is "the adroned" or "perfected" in opposition to the Prākrit or plebeian dialects. That it was not the pure creation of the grammarian's brain but based on actual spoken usage is evident; for some of the rules of his grammar would have no significance except for a spoken language, and there are early traces of dialectic variation. We are expressly told that in the 2d century B.C. the inhabitants of the Āryâvarta or "land of the Aryans" that is the country between the Himālaya and the Vindhya Mountains, were the speakers of the standard Sanskrit. But this does not apply to all the inhabitants of that district. The distribution of the dialects in the drama probably continues a much earlier tradition; here men of the two upper castes speak Sanskrit, those of the lower castes and all women speak Prākrit. As all converse with one another, and the production — the same applies to the recitation of the epics—must have been intelligible to the audience it follows that Sanskrit must have been intelligible even to those who did not speak it, and that is speakers must have understood also the vernaculars. Its position must have been like that of Latin in the Middle Ages or that of Hebrew among the Jews and such is its position in India at present. In it the whole of the classic literature is composed, so that we have the spectacle of the literature of a nation under the domination of a single grammar for centuries, in a way that is without parallel in the history of the world. This language and literature spread throughout the Indian peninsula and further south to Ceylon, to Borneo, Java and the Philippines into further India, Burma and Siam, and, owing to the influence of Buddhism, into central Asia, Tibet, China and Japan.

With regard to the differences between the classic language and the various forms of Vedic it is to be noted that the phonetic status of the language has remained almost exactly the same, that there has been no important addition to the formative or inflectional elements, but that the change has consisted partly in dropping forms that seemed superfluous, partly in settling the usage in favor of one form, for which two or more forms of synonymous value had previously existed; and finally that the vocabulary has been increased by new formations made with the means that were already at hand. The nature of these changes also shows that we are dealing with a literary language. The natural development of the language of the Aryans in India is to be seen only in the speech of the lower classes. The existence of these vernaculars by the side of the literary language is attested, as has been noted, from the time of the Rig Veda. In literature they appear only with the rise of the two great heresies Jāinism and Buddhism. These in their oldest phases employ the Prākrit and Pāli dialects, afterward they too resorted to Sanskrit, so that Prākrit remained in literature only in certain parts of the drama in which it had a traditional right. From these mediæval dialects were evolved in turn the modern dialects, the literary employment of which begins about the 11th century of our era.

Sanskrit Literature.— By Sanskrit literature is meant, therefore, the literature which is composed in the language that conforms to the grammar of Pāṇini. Certain parts of the Epics are no doubt older than that grammar, but it is impossible to tell exactly which these parts are, and moreover in the later working over of this material the tendency has been to bring it into harmony with the classic standard. It will be seen, therefore, that there is no sharp chronological line that can be drawn between the two periods; because on the one hand the beginnings of the classic literature go back to the time before Pāṇini and on the other the later monuments of the Vedic literature were produced after that date. The wealth of the classic literature is enormous, every department except history being well represented and it will not be possible to give more than the briefest mention of the most important authors and works.

Epic Poetry.— Two classes of works are to be distinguished: Itihāsas, Ākhyānas or Purāṇas, "ancient tales," and the Kāvyas or artificial epics. The chief representatives of each are the Mahābhārata and the Rāmāyana. The first is a heterogeneous mass of about 100,000 distichs. The main story is the strife of two Aryan tribes, the Kurus and the Pañcālas. To this only about one-fifth of the poem refers. The remainder consists of episodes and didactic disquisitions chiefly on the duty of the warrior class that have changed the poem from an epic to a dharmacāstra or legal textbook. The Mahābhārata itself recognizes the nature of its origin, when it gives as its author Vyāsa, "redactor." It is known to have reached its present form by 500 A.D. and probably had become a dharmaçāstra by the beginning of our era, while the epic nucleus may be some five centuries earlier than that date. The 18 Purānas that have been preserved are of much later date. Their original character has been changed by abridgment or omission of the ancient tales and the substitution of didactic elements. They are all sectarian, generally Visnuite. The Rāmāyana, a poem of some 24,000 distichs, is for the most part the work of a single poet Vālmīki. Its subject is the story of Rāma, especially the abduction of his wife Sītā by the demon Rāvaṇa who carried her to his stronghold Laṅkā in Ceylon, from which she was rescued by Rāma with the help of Hanuman, king of the monkeys. In the later additions Rāma is made into an avatar of Visnu. The story has been interpreted as an historical allegory but is more probably merely mythological. The main portion of the work is probably older than the formation of the epic kernel of the Mahābhārata. The Kāvyas, or artificial court epics, extant range from the time of Kālidāsa (the beginning of the 5th century) to the 12th century, though there is epigraphic evidence to show that this style of poetry originated before our era and continued in vogue. Of these the most important are the Raghu-vaṇça, 'The Family of Rāma' and the Kumārasambhava, 'Birth of the Wargod,' of Kālidāsa. As Kāvyas are also classed certain prose romances of the 6th and 7th centuries — the best known being the Daça-kumāra-carita of Daṇḍin or "the Adventures of the Ten Princes."

Lyric Poetry.— Long lyric poems are rare. Such are Kālidāsa's Meghadūta, or 'Cloud Messenger,' in the 115 stanzas of which an exile implores a cloud to bear to his wife the message of his love; and the highly poetical description of the seasons from the point of view of a lover, by the same poet entitled Ṛtu-saṁhāra, 'Cycle of the Seasons.' More frequently each stanza is a poem in itself: these are published in collections frequently styled Çatakas, 'Centuries.' Religious lyric poetry is represented by similar collections. Famous in both departments was Bhartṛhari (of the 7th century).

Drama.— This is the department in which Sanskrit literature has reached the highest point of merit. Noteworthy are the resemblances to the Elizabethan drama, the absence of tragedy, the mixture of prose and verse, and the employment of different dialects, mentioned above. The origin of the drama is obscure, but there is no reason to assume Greek influence. Etymology points to the original prominence of dancing. Combined with song and pantomime it constitutes the germ from which by the addition of the dialogue—at first extemporized—the drama was evolved. The first and greatest of the dramatists is Kālidāsa and his masterwork is the Çakuntalā. Besides this have been preserved the Vikramorvaçī and Mālavikāgnimitra. Bhavabhūti of the 8th century is the next in fame: of his works remain, the Mālatī-mādhava, Mahāvīra-carita and Uttara-rāma-carita. Between these in time are the Mṛcchakatikā, 'Clay Cart' and the Ratnāvalī, 'Pearl Necklace,' attributed to the kings under whose patronage they were brought out.

Fairy Tales and Fables.— This department is historically most interesting because of its deep influence upon the mediæval and modern literature of Europe. Characteristic is the human-like rôle assigned to the animals; the mingling of prose with poetry of a gnomic character and frequently of a high order of merit; and the system of arrangement, story being set in story as in Arabian Nights. The source of the beast fables is the Jātakas or Buddhistic birth stories, the chief character being identified with Buddha in a previous existence. Works of this class are called Nīti-çāstras or 'Text-Books on Good Behavior,' being intended for the political and ethical training of princes. They have been recast by the Brahmans in the interests of their religion. Of these the oldest is the Pañca-tantra, so called from its five books. Its existence in the 6th century is proved by its translation at that date into Pehlevi. From it chiefly is derived the Hitopadeça, 'Book of Good Counsel,' the manuscripts of which go back to the 14th century. The most important collection of fairy tales is Somadeva's Kathā-sarit-sāgara, 'Ocean of the Streams of Stories,' of the 11th century.

The works of Sanskrit literature relating to the sciences and arts, grammar, lexicography, metrics, poetry, rhetoric, philosophy, law, astronomy, mathematics, medicine, music, painting, sculpture and the technical arts, cannot come within the scope of this article. For works of reference, see under VEDIC.

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SANSOVINO, sän-sō-vē'nō, **Andrea,** Italian sculptor: b. Monte San Savino, near Montepulciano, 1460 (whence he was familiarly known as SANSOVINO, his real name being CONTUCCI); d. 1529. He was a pupil of A. Pollaiuolo, and early formed his style on that of Leonardo da Vinci. It was under their influence that he produced such reliefs as the 'Coronation of the Virgin'; 'The Annunciation,' and the 'Pietá.' In 1491 he was summoned by the king of Portugal to Lisbon, where for nine years he exercised his art as sculptor and architect. Returning to Florence in 1500 he carved the group of 'Christ's Baptism' over the east portal of the Baptistery, which exhibited a nobility of form and expression unparalleled at that period, although he never completed the group. A statue of the Madonna and one of John Baptist for the cathedral at Genoa were his next works, and afterward he accepted a commission from Pope Julius III to execute the tombs of Cardinals Basso and Sporza for the choir of Santa Maria del Popolo. In these sepulchral monuments we see that the high-water mark of the 15th century art is reached; they are the most masterly sculptures of their kind that Rome possesses. In 1512 he completed his 'Saint Anne with Two Other Saints' in the church of San Agostino in Rome. He was then entrusted by Pope Leo X with the decorations of the church at Loreto (1513–29). Among the reliefs there the 'Annunciation'; the 'Nativity'; and the statue of 'Jeremiah' are his own works; the rest of the decorations were produced under his direction by various artists. Nothing can be finer than the blending of classic severity with the freshness of Renaissance life in these figures which exhibit the results of a pure study of nature. Expression and action are full of deep feeling, yet not so emphasized as to overstep the line of modesty.

SANSOVINO, Jacopo Tatti, Italian sculptor and architect: b. Florence, 1479; d. Venice, 27 Nov. 1570. He took his name from the great artist who had been his teacher, and began his career in Florence where his first works of note were his statue of 'Jacob' in the cathedral and his marble 'Bacchus' in the Bargello. Belonging also to this early period is a 'Madonna

and Child' in the church of San Agostino at Rome. In 1527 he went to Venice where his genius being quickly recognized he was appointed architect to the republic. His untiring labors from that time to his death have left his stamp both on the sculptural and architectural monuments of Venice. He is a brilliant example of the Italian artists in the noonday splendor of the Renaissance and in his architectural creations unites play of fancy and elegance of proportion with the most impressive and monumental dignity. His pre-eminence as a sculptor is not so evident; his plastic work is often unpleasing and evidences a failure to master either the principles or the materials of his art, so that his work appears mannered and mechanical. His greatest successes in architecture are the 'Corner Palace' (1532); the library of Saint Mark's, a splendid example of Italian Renaissance (1536); the Mint; and the churches of San Martin, San Giorgio dei Greci and San Giuliano. The 'Burial of Christ' and the 'Resurrection,' are fine reliefs on the bronze doors of the sacristy of Saint Mark's, and among other plastic works of his are a sitting figure of 'Saint John' in Santa Maria dei Frari; the statues of 'Hope' and 'Love' on the tomb of the Doge Venier in San Salvatore; and the gigantic figures of 'Mars' and 'Neptune' in the Doge's palace. Consult Rosenberg in Dohme's 'Kunst und Künstler.'

SANTA ANA (sän'tä ä'nä) **INDIANS,** a Pueblo tribe of New Mexico. See KERESAN.

SANTA ANA, Cal., city, county-seat of Orange County, on the Southern Pacific and the Southern California railroads, 30 miles southeast of Los Angeles. It was founded in 1869. It is the commercial centre of Santa Ana valley, on the most fertile sections of California; oranges and fruits of all kinds, vegetables, wheat and sugar beets are produced in this region, and there are also large peat-beds in the vicinity. The principal industries include a fruit and vegetable cannery, flour mills, large lumber and planing mills and soda-works. Santa Ana is connected by a local railway with Newport Beach, 10 miles distant, a popular seaside resort. There is a public high school, established in 1889, and a public library; the Orange County Business College is also located here. The city owns its waterworks, the supply being derived from artesian wells. Pop. (1920) 15,485.

SANTA ANA, Salvador, city and departmental capital, 50 miles by rail northwest of San Salvador and the Pacific port of Acajutla. It is a well-built city, the second in size of the republic, and lies about 2,100 feet above sea-level, in a mountain-encircled valley, abounding in coffee and sugar plantations, and forests. The Doric church, municipal building, hospital and military barracks are the principal buildings. There are numerous manufactures of domestic commodities and an active export trade in coffee and sugar, which increased considerably after the railway reached the city in 1900. Pop. 48,200. In the vicinity is the source of the Santa Ana River a tributary of the Lempa; and Santa Ana 8,300 feet high, the loftiest volcano in the republic, rises nearby.

SANTA ANA, Philippines, formerly a pueblo of the province of Rizal, constituted a district of the city of Manila in 1902. It is the centre of extensive vegetable gardening for Manila markets. Pop. 2,200.

SANTA ANNA, sän'tä än'nä, or **ANA, ANTONIO LOPEZ DE,** Mexican general and politician: b. Jalapa, 21 Feb. 1795(?); d. Mexico City, 20 June, 1876. He entered the army at 15, and attained public prominence as a supporter of Iturbide in 1821. The following year, after having expelled the royalists from Vera Cruz, he took command in that city, where he led a revolt (2 Dec. 1822), which hastened the retirement of Iturbide, who had made himself emperor. After the defeat of the Federal party in 1822 Santa Anna retired to his estate; but he emerged again in 1828 in support of Guerrero's claims to the presidency, in which the latter supplanted Pedraza. In 1829 the Spanish invasion furnished Santa Anna a favorable opportunity, and as minister of war and commander-in-chief at the head of the Federal forces he compelled Barradas to capitulate at Tampico, 11 September. He soon joined with Bustamante in overthrowing Guerrero, and setting up the former in his place, but also, in 1832, led in the overthrow of Bustamante himself, and the restoration of Pedraza. In 1833 Santa Anna was chosen President, and soon after renounced the party of the Federalists and put himself at the head of the Centralists, who desired the centralization of power in the executive government. His popularity with the army was not shared in by the nation at large, which feared that he was aiming at imperial power. On 11 May 1835 he defeated an insurgent army on the plains of Guadalupe, and as the blow was fatal to the Republicans he was shortly afterward named dictator. The Federal Constitution was abolished and the governors of the several states became dependent upon the central power. Texas, however, having long nourished a revolutionary feeling, now broke out into rebellion. Santa Anna attacked San Antonio in February 1836, stormed the Alamo (q.v.), and massacred its defenders, 6 March, and going forward pursued the Texans under Sam Houston (q.v), by whom, however, 21 April, at the battle of San Jacinto (q.v.) his forces were routed and himself taken prisoner. He secured his release by a treaty recognizing the independence of Texas, which, however, was repudiated by Mexico, that country also suspending his dictatorship. He was permitted to go to the United States, and after his return to Mexico in 1837 lived in retirement for a year, but offered his services to his country against the French in 1838, and taking command of the troops, repelled the assault on Vera Cruz (5 December) and forced the enemy to retire. In this engagement he lost a leg, a casualty which, however, contributed to restore him to popular favor. He again became a leader of the Centralists, and from October 1841 to June 1844 was virtual dictator under the title of President. The new Constitution of 12 June 1843, under which he was formally elected President, increased his dictatorial powers, the exercise of which led to a fresh revolution, resulting in his overthrow. He was taken prisoner in January 1845 and banished. But on the eve of the war with the United States, he was recalled (July 1846), and was first appointed generalissimo by the provisional government and in December was made provisional president. At the opening of 1847 he led an army of 20,000 against the American troops under General Taylor, and fought the battle of Buena Vista (q.v.) 22–23 February, in which he was defeated. On 18 April he was attacked and defeated at Cerro Gordo (q.v.) by General Scott. Immediately after the battle of Chapultepec (q.v.) the City of Mexico fell and was entered by the Americans (14 September). Santa Anna, escaping from the city, briefly continued a desultory warfare; but on 5 April 1848, having resigned the presidency, he received permission to retire from the country and sailed for Jamaica, going thence to Venezuela. In 1853 he was recalled and elected President for one year, but after setting up an odious despotism, he proclaimed himself (December 1853) President for life, with the title of Serene Highness and the right of nominating his successor. Revolution followed in March 1854, and when he saw that his cause was lost Santa Anna fled from the capital (9 Aug. 1855) and found refuge in Cuba, Venezuela and Saint Thomas. In this absence he was tried and condemned for treason, and his estates were confiscated. He returned to Mexico during the French occupation (1864), but was not permitted to remain. In 1867 he again returned, but was once more exiled and went to live in the United States. Finally, after the death of Juarez and the amnesty of 1874, he was permitted to reside in his own country, where his career ended in poverty and obscurity. Consult Wilson, 'Mexico' (1856). See MEXICAN WAR; MEXICO; TEXAS.

SANTA BARBARA, bär'ba-ra, Cal., city, county-seat of Santa Barbara County, on Santa Barbara Channel, an arm of the Pacific Ocean; and on the Southern Pacific Railroad, about 360 miles southeast of San Francisco. It has regular steamer communications with San Francisco, San Pedro, San Diego, and other Pacific ports. The Santa Ynez Mountains shelter the city from the north winds, and the ocean breezes serve to make the temperature equable and salubrious all the year. The number of health seekers who visit the place in winter has given it the name «American Mentone.» It was visited, in 1603, by Sebastian Vizcaino. In 1782, Governor Felipe Neve established a presidio which was maintained until the arrival of General Frémont. Among the earliest white settlers were Andrew, John and Thomas McDonnell of County Galway, Ireland, who for many years maintained the greatest sheep ranches of the West in Santa Barbara County. Santa Barbara is in a remarkably fertile agricultural region. It raises large quantities of beans, chiefly limas, and large quantities of English walnuts. Probably a thousand carloads of walnuts are marketed from this county yearly. In the northern portion of the county there are many oil wells, some yielding as many as 3,000 barrels daily. In the vicinity are mineral springs, from which many hundred thousands of bottles of Veronica and Bythinia waters are shipped. Santa Barbara is noted for the quality of the lemons shipped from its confines.

The education establishments of the city include the State normal school located on a high hill just north of the city, and a high school with an attendance of 450 pupils. It has the usual grade schools. The Saint Francis College, conducted by the Order of Saint Francis, has two fine buildings and some hundred students in collegiate work. It has a faculty of much more than ordinary ability. The parochial school of the parish church at Santa Barbara is excellently conducted, and gives to the children of Catholic parents an opportunity to have their children educated within the pale of the Church. The four banks within the city have a combined capital of $1,000,000, and deposits of $5,000,000.

The Old Mission founded by the immediate successor of Junipero Serra is situated just without the city limits. The building was built in 1815, and upon the ruins of the former mission established in 1786. Montecito is situated to the east of Santa Barbara and is a suburb of that city. In this locality famed the world over for its beauty are hundreds of beautiful homes. Many of them are works of art. Pop. (1920) 19,441.

SANTA BARBARA, Honduras, the capital of the department of Santa Barbara, situated on the Santa Barbara River, 65 miles southwest of Puerto Cortés. It is a comparatively well-built town, manufactures sombreros and spirits, and is a commercial depot for the products of the surrounding country destined for Puerto Cortés. The latter is reached by a high-road and, for a part of the way, by rail. Pop. between 5,000 and 8,000. Also a town on Samana Peninsular, San Domingo. Pop. 5,000.

SANTA BARBARA, Philippines, pueblo, province of Iloilo, island of Panay, between a branch of the Janipaan River on the north and the Tigón River on the south, 12 miles north of Iloílo, the provincial capital. Pop. 13,000.

There is also a smaller pueblo of the same name, province of Pangasinán, Luzon, 12 miles east of Lingayén; at the crossing of two roads. Pop. 7,595.

SANTA BARBARA, a channel in the Pacific Ocean, between the northern islands of the Santa Barbara group and the mainland of California. It varies in width from 20 to 30 miles.

SANTA BARBARA ISLANDS, a group off the coast of California, lying 20 to 60 miles from the mainland, south and southeast of Santa Barbara city. They are nine in number; San Miguel, Santa Rosa, Santa Cruz, Anacape, Santa Barbara, Santa Catalina (q.v.), San Clemente, San Nicolas and San Juan. From San Miguel on the north to San Clemente is about 155 miles.

SANTA BARBARA DE OCAMPO, dā ō-käm'pō, Mexico, a town in the state of Tamaulipas, situated 45 miles south of Ciudad Victoria. It lies in a fertile river-plain at the foot of the eastern Sierra Madre, and is the centre of a rice, sugar and fruit-growing district. Pop. about 10,000.

SANTA CATALINA, kă-tă-lē'nă, an island of California, one of the Santa Barbara Islands, separated from the mainland by San Pedro Channel and Gulf of Saint Catalina. The island was discovered in 1542 by Juan Rodriguez Cabrillo, a Portuguese explorer in the service of Spain, and was named by him San Salvador. The explorer Sebastian Vizcaino visited the island 60 years later and gave it the present

name, in honor of Saint Catharine of Sienna. The island is 25 miles long, with an average width of four miles; area, about 55,000 acres. It is hilly and well-wooded and has many deep gorges. Avalon (q.v.) is the only town on the island. The surrounding waters abound with fish. The island is a favorite resort, especially from June to October.

SANTA CATHARINA, kä-tä-rē'nä, Brazil, a southern maritime state bounded on the north by the state of Paraná, on the east by the Atlantic, on the south by the state of Rio Grande do Sul and on the west by the Argentine territory of Misiones; it includes the fortified island of the same name and several smaller ones on the coast; area, 28,620 square miles. Desterro officially Florianopolis, is the capital. A series of valleys run west to east, formed by spurs of the boundary mountain range, and the state is watered by the rivers São-Francisco, Aracary, Tapecu, Tijuca, Tufarão and numerous streams all falling into the Atlantic. The headwaters of the Uruguay River are in this state. The soil, though in the lower lands sometimes sandy, is fertile, the climate mild and the seasons regular. Sugar, rice, mandioca, millet, beans, onions of immense size and garlic are the chief cultivated products, considerable quantities of which are exported to Rio de Janeiro. The indigo and cochineal plants grow luxuriantly, and wheat and flax give good returns. The state is well wooded, producing excellent timber; and gold, silver, iron, coal and petroleum exist. The forests are infested by ounces, coatis, monkeys, pigs and other animals. Birds are numerous, including several varieties of humming-birds, and the lakes and rivers are frequented by innumerable geese and other water-fowl. Pop. 320,289.

SANTA CLARA, kla'ra, Cal., town in Santa Clara County, on the Southern Pacific Railroad, 46 miles southeast of San Francisco. It was settled by the Franciscans in 1777, became a town in 1852, and received a new charter in 1867. It is the centre of a rich agricultural and fruit-raising region, and has a number of fruit-packing establishments; it also contains several mills, a tannery, sash and door factory, casket-works and a wind-mill factory. It is connected with San José, the county-seat, by a railroad and electric street railway. The public school system includes a high school and there is a public library. The town is also the seat of Santa Clara University, a Roman Catholic institution founded in 1851, and the Notre Dame Academy, a Roman Catholic convent school and the University of the Pacific (q.v.) is nearby. The Carmelite Order of Nuns occupy a magnificent monastery erected at a cost of $250,000, founded by the late Alice Phelan Sullivan. The Black Company is the largest green-fruit packing industry on the Coast. The *Santa Clara Journal*, the semi-weekly newspaper, is the oldest publication in Santa Clara County. The old Santa Clara mission is of great historic interest. A fine boulevard, the Alamada, connects the town with San José. The government is by a board of five trustees, three of whom are elected two years. Pop. 4,998.

SANTA CLARA, Cuba, (1) city, capital of the province of Santa Clara, on the Cuba Railroad, 155 miles east-southeast of Havana. It was founded in 1689. Formerly it was the eastern terminus of the railroad from Havana, but in 1902 the railroad system was extended to the eastern end of the island. It is the centre of a fertile agricultural region, is the second largest inland city of Cuba, and has considerable commercial importance, which is increasing with the development of the railroad facilities. Silver has been mined in the vicinity, but not successfully; an excellent quality of asphalt and graphite are obtained and exported; and illuminating gas for lighting the city has been manufactured from this asphalt; petroleum is also reported in the vicinity. The city is well built, the streets are wider than is usual in the older Cuban cities, and municipal sanitation has been improved since 1898. The location is naturally healthful and favorable for further commercial development. Pop. 54,885.

(2) Province in the central part of Cuba, bounded on the east by Camagüey and on the west by Mantanzas; area, 8,266 square miles. The surface is undulating, with ranges of hills in the east and south, the highest peak rising 2,900 feet. It has rich agricultural lands; the production of sugar is the chief industry, the province containing some of the largest sugar plantations and factories in the island. Tobacco, coffee and fruits are other products of commercial importance; wax and honey are obtained, and the timber is abundant and valuable, there being 307,910 acres of public forests in the province. There are also excellent grazing grounds and cattle raising is a profitable industry. The mineral resources are second only to those of the province of Oriente, but not so well developed; asphalt is mined, and copper, gold and silver have been located. The Cuba Railroad traverses the province from east to west and there are short branch roads; there are few good highways, however, and the need of improvement in transportation facilities is felt. Pop. 569,416.

SANTA CLARA, Order of. See ORDERS (ROYAL) AND DECORATIONS.

SANTA CLARA, University of, an institution for higher learning established at Santa Clara, Cal., on the site of the old Santa Clara Mission in 1851. It was incorporated as a university in 1875, but was known as a college until 1912 when the title university was assumed. Its courses comprise philosophy and letters; general science; civil, mechanical and electrical engineering; architecture; pedagogy; and a pre-medical course. It is Roman Catholic in denomination. There are 325 students and 34 instructors; the buildings and equipment are valued at $720,000.

SANTA CLAUS, sănt'ą klâz. See NICHOLAS, SAINT.

SANTA CROCE, sän'tä krō'chā. See FLORENCE.

SANTA CRUZ, sän'tä kroos, **Andres**, Bolivian soldier and politician: b. La Paz, Bolivia, about 1794; d. Saint Nazaire, France, 1865. He was of partial Indian descent, entered the Spanish army and rose to the rank of colonel. He was captured by the patriots in 1820, persuaded to adopt their cause, became a general in the army, and led an invasion of Upper Peru in 1823. In 1826–27 he was acting President of Peru under Bolivar and in 1829 he was elected President of Bolivia for a term of 10 years, receiving also the title of grand marshal. His measures were progressive and the country enjoyed great prosperity under his administration. From the first he adhered to his purpose of uniting the Pacific Coast republics, and his successful invasion of Peru in 1836 was followed by his proclamation of the Peruvian-Bolivian confederation. In 1839 a Chilean army invaded Bolivia and defeated Santa Cruz at Yungay. He resigned and left the country, whereupon the confederation was dissolved. He was afterward engaged in Europe on various diplomatic missions for Bolivia.

SANTA CRUZ, Cal., city, county-seat of Santa Cruz County, on the Bay of Monterey, and on the Southern Pacific and South Pacific Coast railroads, 60 miles south of San Francisco. It was first settled in 1791 by Franciscan missionaries, and was incorporated as a city in 1876. It is in a fruit-raising region; the chief manufacturing establishment in the city is a powder factory; other manufactures of importance include lead, bitumen and leather; and there are also lumber and planing mills, a soap factory and a box factory. The city is beautifully situated on land rising gradually from the bay, the climate is equable and pleasant, and it has become one of the most popular health and tourist resorts of central California. A bathing beach, picturesque drives and a large public park overlooking the bay add to the attractions of the place. The public buildings include a courthouse, a hall of records, the city hall, and the public library. The city has a public high school and parochial schools; and is the seat of the School of Holy Cross (a Roman Catholic convent school), and of the Catherwood's Business College (coeducational). The city is governed on the commission plan. Pop. (1920) 10,917.

SANTA CRUZ, sän'tä kroos, five Mexican towns bear this name, the largest being in the state of Guanajuato, situated in a fertile agricultural district a few miles southeast of Guanajuato, with a population of 7,239.

SANTA CRUZ, Philippines, pueblo, capital of the province of Laguna, Luzon; on southeast shore of the Bay Lagoon (Laguna de Bay), at the mouth of the Santa Cruz River, 34 miles southeast of Manila. It is connected by highway with Manila, Batangas, Cavite and Tayabas, and carries on an important trade. It is also the terminus of a projected railroad from Manila. The region is famous for the manufacture of palm wine or brandy, the sale of which was a government monopoly under Spanish rule. The town is well built and contains fine municipal and ecclesiastical buildings. Pop. 13,140.

There are also three smaller pueblos of the same name: (1) Pueblo, province of Dávao, Mindanao, on Dávao Bay, 15 miles south of Dávao; it has an excellent harbor of good depth; pop. 720; (2) Pueblo, province of Ilocos Sur, Luzon, 34 miles south of Vigan; on the main highway; pop. 5,876; (3) Pueblo, province of Zambales, Luzon, on sea-coast; 32 miles north of Iba; on the main highway; pop. 4,600.

SANTA CRUZ, sän'tą krooz, or **SAINT CROIX**, sânt kroi, the largest of the Virgin Islands of the United States, lying 60 miles east by south of Porto Rico; area, 84 square miles. It is hilly except in the southern part; well-watered, and fertile, and has a larger proportion of land under cultivation than the other islands of the group. Sugar is the chief product; tobacco, cotton and fruits are also cultivated. Some cattle are raised. The chief articles of export are sugar and bay rum. The climate is at times unhealthy, the temperature varies from 54° to 72°. Earthquakes and hurricanes are frequent. The capital and residence of the governor is Christianstadt; and in the island is another small town called Frederikstadt. The island was discovered by Columbus in 1493, and was occupied by the Dutch, the English, the Spaniards and the French; ceded to Denmark by France, it was occupied by the English in 1807, but finally restored to Denmark by the Treaty of Paris. It came into the possession of the United States by purchase 31 March 1917. Pop. about 16,000. See VIRGIN ISLANDS.

SANTA CRUZ ISLANDS, or QUEEN CHARLOTTE ISLANDS, Melanesia, an archipelago in the Pacific Ocean, belonging to Great Britain, and situated in lat. 10° S. and long. 166° E., north of the New Hebrides, and east of the Solomon Islands. The group comprises about a dozen small islands, with a combined area of 362 square miles. The larger islands are volcanic and mountainous. Most of them are surrounded by coral reefs, and nearly all the small islands are of coral formation. The climate is hot, humid and unhealthful, but the soil is very fertile, and the vegetation luxuriant. The inhabitants, who are chiefly Melanesians and still uncivilized, are supported partly by their plantations of coco-palms, partly by fisheries and by trading with neighboring islands. The archipelago was discovered in 1595 by Mendaña. Bishop Patterson was murdered there in 1871. Since 1893 it has been an administrative dependency of the Solomon Islands. The population is about 7,000.

SANTA CRUZ DE NAPO, krooth dā nä'pō, pueblo, province of Marinduque, Philippines, on the northeast coast, 18 miles east of Boac. The town lies about a mile and a half from the shore, and three miles from the anchorage ground. It is a port of entry for coasting vessels, and the anchorage is well protected; there is difficulty, however, in landing at the point nearest the town. Santa Cruz is surrounded by a fertile agricultural country; it is not as well built as Boac, the provincial capital, but its situation is more advantageous owing to the superior harbor. Pop. 15,800.

SANTA CRUZ DE LA SIERRA, kroos dā lā sē-ĕr'rā, Bolivia, (1) town, capital of the department of Santa Cruz de la Sierra; on the Piray River, on the eastern slopes of the Andes. The town was founded in 1575, and originally bore the name of San Lorenze de la Fontera. The houses are mostly one story high, built with timber and earth, with large balconies and uneven roofs. Pop. 18,335. (2) Department, the easternmost department of Bolivia, bounded on the north by department of Beni, and the Brazilian province Matto-Grosso; on the east by the river Paraguay and the Brazilian territory; on the south by the desert of Gran Chaco and Chuquisaca department; on the west by the department of Cochabamba; area, 126,340 square miles. It is mostly level, except in the western

part, where it reaches the Andes. It is drained by the Rio Mamore and the Rio Beni, and their tributaries. The central region is heavily wooded, with some open marshes and plains. It is thinly populated, the most of the towns being in the western part and along the rivers. The soil between the mountains and the central forests is fertile and yields sugar, coffee, cacao and rice. Some cotton cloth is manufactured and gold is mined in the mountain district. Pop. (estimated) 209,850.

SANTA CRUZ DE TENERIFFE, krooth dā tĕn-ĕ-rĭf′, Canary Islands, city, capital and commercial port of the Canary Islands, on the northeast coast of the island of Teneriffe (q.v.). Many of the houses are handsome, and of one and two stories high; but the majority are low. The streets are well paved, and lighted by electricity. There is a square, surrounded by wooden edifices, and adorned with a colossal statuary group representing the apparition of the Virgin of Candelaria to the Guanches, the original inhabitants. Besides the custom-house and the military hospital, there are scarcely any public buildings; the church of San Francisco is the finest. The harbor, which is very secure, has a magnificent mole, of modern construction; other works, including a breakwater, have recently been constructed. Tomatoes, bananas, potatoes, wine, brandy and cochineal are the chief articles exported; and the imports consist largely of English, French, Spanish and German manufactures, with coal, grain, flour, etc. Pop. 16,000.

SANTA FÉ, fā, or **SANTA FÉ DE LA CRUZ,** Argentina, (1) Capital of the province of the same name, near the junction of the Salado with the Paraná, 299 miles by rail northwest of Buenos Aires. It stands on an eminence which is prominent in a district otherwise level. The Cabildo, the most important building, stands on the plaza or main square. Santa Fé is the seat of the governor, legislature, and the bishop. There are several churches and monasteries, also a normal school for teachers. Hides and timber form the chief articles of trade. The principal industrial works are: a foundry, macaroni and oil factories, and tile works. Pop. 33,200.

(2) The province of Santa Fé covers 50,916 square miles, and has a rapidly increasing population. Rosario (q.v.) is the largest city. There are vast numbers of cattle, sheep and horses on extensive farms, and 3,688,118 acres of land are planted in cereals. Pop. 816,401.

SANTA FE (Holy Faith, contracted from La Villa Real de Santa Fe de San Francisco), New Mexico, city, capital of the State and county-seat of Santa Fe County, on the Santa Fe River, the Denver and Rio Grande, the New Mexico Central and the Atchison, Topeka and Santa Fe railroads; it is 21 miles east of the Rio Grande and 58 miles northeast of Albuquerque. Chartered as a city in 1890.

Principal Features.—The streets in the older part are narrow and crooked and are occupied chiefly with one-story adobe houses, but in the more modern portion the streets are broad and straight and are improved with good business houses and neat residences, many of them of stone and brick. A public park, known as the Plaza, occupies a square in the middle of the city, in which are two monuments and a memorial fountain. The city contains also a monument to Governor Perez, who was assassinated in 1837, and another to Kit Carson who lived at Taos. Santa Fe is the seat of a Roman Catholic archbishopric and until 1897 the military post known as Fort Marcy was situated there. The city contains the oldest national bank in the State of New Mexico, and has a public high school and ward schools. In addition to the State library there are three public and school libraries. The rooms of the Museum of New Mexico, the School of American Research, and the New Mexico Historical Society contain interesting historical and archæological collections, while the attractive new building of the Museum of New Mexico, constructed in the style of the New Mexico mission architecture, houses the art collection of the State. Santa Fe is beautifully situated at an altitude of 6,998 feet, in the midst of an agricultural and mining region and its principal business consists of supplying the immediately surrounding country with merchandise. Water for domestic purposes, for local irrigation and electric power, is supplied by reservoirs above the city on Santa Fe Creek. There are commodious hotels. Owing to its unsurpassed climate Santa Fe has become a popular resort for health-seekers and its deep historical interest attracts many tourists; but as a business centre it has declined since the building of the first railroad brought the overland trade via the Santa Fe trail to a close and diverted much traffic to Albuquerque. Pop. (1920) 7,236.

Buildings, etc.—By reason of its long political and ecclesiastical importance Santa Fe contains by far the most interesting and some of the finest buildings in the Southwest. First in historical importance is the "Palace," a massive-walled, one-story structure of adobe, a block in length and facing the Plaza on the north. It was doubtless erected early in the 17th century and originally was square, with a large court in which the Spanish garrison was quartered. The building formed the headquarters of the Spanish and Mexican provincial governments successively until 1846, when General Kearny took possession of New Mexico for the United States. Diego de Vargas, the reconqueror of New Mexico in 1692, and Zebulon Montgomery Pike (after whom Pikes Peak was named), with many others of note, were imprisoned therein, and Gen. Lew Wallace finished his 'Ben Hur' in one of its rooms while governor of the Territory of New Mexico. Next in importance, perhaps, is San Miguel Church, a plain adobe structure, largely destroyed by the Indians in 1680, restored in 1710, and greatly modified within recent years. The cathedral, a fine modern sandstone edifice, is built around a parish church known as the Parroquia, which was probably erected on the site of a still older church, built by Fray Alonso de Benavides in 1622–27, but destroyed in the revolt of 1680. The cathedral contains handsome carved stone reredos originally erected in the former Capilla de los Soldados (built in 1730 on the south side of the Plaza) by Governor Marin del Valle and his wife in 1761. Of interest also in the history of Santa Fé are the Rosario Chapel, said to occupy the spot where Vargas made his vow before the surrender of the city in 1692; the Garita, formerly a military



1 The so-called "Oldest Dwelling House in the United States"



2 The Old Palace at Santa Fe

outpost at which the leaders of the rebellion of 1837 were executed, and long the site of a cemetery; the earthworks of Old Fort Marcy, north of the city, erected during the Mexican War; and an ancient dwelling mistakenly believed to antedate the Spanish conquest. The State Capitol, of brick and stone, completed in 1900, at a cost of $200,000, is an attractive building. There are also the new Museum of New Mexico, above mentioned, a Federal building, the Scottish Rite Cathedral, a State penitentiary (cost $150,000), a county courthouse, Saint Vincent's Hospital, Saint Vincent's Sanatorium, Saint Vincent's Orphanage, an Industrial School for the Deaf and Dumb, the Allison Presbyterian Mission (opened in 1881), the Government Indian School with 300 pupils, Saint Catharine's School (R.C.), San Miguel College (R.C.), Loretto Academy (R. C.), Mary E. James Mission School, and the School of American Research. Besides the cathedral there are two other Roman Catholic churches, a Protestant Episcopal church, an English and a Spanish Presbyterian church and an English and a Spanish Methodist Episcopal church.

History.— Santa Fe was established, on the site of at least one prehistoric Indian pueblo, by Juan de Oñate in 1605; it is, therefore, the second oldest white settlement in the United States, Saint Augustine, Fla., alone exceeding it in point of age. (See NEW MEXICO). The prospects of the town during its first few years were not encouraging. In 1617, there being only 48 colonists and soldiers in the province, which was surrounded by predatory tribes, the king, in response to an appeal for aid, rendered the desired succor, and by 1630 Santa Fe contained 250 Spanish inhabitants. In 1623 Fray Alonso de Benavides, custodian of missions, began the erection of a church, which was finished five years later, probably on the site of the present cathedral (see above). On 10 Aug. 1680 the Pueblo Indians, led by a native named Popé, arose in rebellion against the Spaniards, killed 400 of the 2,500 colonists, soldiers and priests, and laid siege to the capital until the 20th, when Governor Otermin and a thousand survivors who had taken refuge in the palace made a sortie, killing 300 of the Indians and capturing 50, who were afterward hanged, and on the following day started on a long overland journey to El Paso, Tex. Santa Fe remained in possession of the Indians until September 1692, when Governor Vargas recaptured the town with but little opposition, and late in the following year it was resettled with about 800 new colonists. Hostilities were renewed during the winter, but the Indians were soon overpowered and 70 of the participants hanged in the Plaza. There were several proposals to move the seat of the provincial government in the 18th century, but nothing was accomplished. French-Canadian trappers found their way to the Rio Grande by the middle of the century, followed by a brisk trade between New Mexico and Chihuahua, and, early in the 19th century, between the province and the American frontier, Santa Fe being the western entrepôt. This trade, which became known as the "commerce of the prairies," was conducted over the Santa Fe trail, first from Kaskaskia, Ill., later from Franklin and Independence, Mo., and increasing from $15,000 in 1822 to $750,000 in 1844. During the rebellion of 1837 Governor Perez, the chief justice and other officials were killed and a Taos Indian installed as governor, but he was succeeded in 1838 by Manuel Armijo, who thwarted an attempt by 300 Texan rangers to invade Santa Fe in 1841. On 18 Aug. 1846 Gen. S. W. Kearny took possession of the town in the name of the United States, issuing a proclamation to that effect on the 22d. An adobe fort and blockhouse were erected on the northern heights and named in honor of Secretary of War Marcy, and under its embankments 200 Missouri volunteers were buried during the winter of 1846–47. Charles Bent, the first American civil governor, was murdered at Taos in January 1847; in the same year the first legislative assembly was held at the capital, the first newspaper was established and a saw-mill erected. In 1848 the treaty of peace with Mexico was proclaimed from the Palace, the *New Mexican* (still published) was founded and the Roman Catholic vicariate-apostolic of Santa Fe was established. New Mexico becoming organized as a Territory of the United States 3 March 1851, Santa Fe was established as its seat of government on 14 July. On 3 March 1862, during the Civil War, Santa Fe was abandoned by Union forces and occupied a week later by Confederates, but it was again evacuated on 8 April and occupied by the Federals on the 11th. The first railroad entered Santa Fe 9 Feb. 1880. Consult Bancroft, H. H., 'History of Arizona and New Mexico' (San Francisco 1884); Hodge, F. W., 'Santa Fe' (in L. P. Powell's 'Historic Towns of the Western States,' New York 1901); Twitchell, R. E., 'Leading Facts of New Mexican History' (2 vols., Cedar Rapids 1910); *Old Santa Fe* 1914–17.

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SANTA FÉ TRAIL, The. See ROADS AND HIGHWAYS.

SANTA FÉ DE BOGOTÁ, dä bō-gō-tä', and **DE GUANAJUATO,** dā gwä-nä-hoo-ä'tō. See BOGOTÁ and GUANAJUATO.

SANTA MARIA, mä-rē'ä, Domingo, Chilean politician: b. Santiago, Chile, 4 Aug. 1820; d. there, 1889. He was graduated from the University of Santiago, admitted to the bar in 1847, interested himself in political matters and in 1851–52 was involved in an insurrection which caused his banishment for a year. On his return he was elected to Congress, made a reputation as an orator, and in 1858–59 was again banished. He was Minister of Finance under Perez in 1863–64, and in 1868 was appointed to the Supreme Court. He afterward served as Minister of Foreign Affairs, of the Interior and of War under Pinto, and gained great popularity by his measures during the war with Bolivia and Peru. He was elected President in 1881 for a term of five years, successfully terminated the war, subdued the Araucanian Indians, and by his able administration of affairs retained his popularity throughout his term of office. He was afterward president of the Senate. He is the author of 'Biografía de José Miguel Infante' (1853) and 'Memoria sobre los sucesos ocurridos des de la caida de D. Bernardo O'Higgins en 1823' (1858).

SANTA MARIA, Philippines, (1) Pueblo, province of Ilocos Sur, Luzon, 15 miles south of Vigan. It is on the main highway, and several cart roads lead from here to the interior. In December 1900, 2,150 insurrectionists surrendered here and took the oath of allegiance to the United States. Pop. 10,030. (2) Pueblo, province of Zamboanga, Mindanao, also called BIASONGAN, on the western sea-coast at the mouth of a river, 56 miles north of Zamboanga. It has a well-sheltered harbor. The surrounding region is heavily timbered with valuable woods, and one of the largest saw-mills in the southern Philippines has been erected here.

Two smaller pueblos have the same name: (1) pueblo, province of Pangasinan, near the Agno River, 32 miles east of Lingayen; pop. 3,940; (2) pueblo, province of Zamboanga, Mindanao, in the extreme southwest, three miles northwest of Zamboanga, the provincial capital; pop. 2,200.

SANTA MARIA DE PANDI, dä pän'dē, Philippines, pueblo, province of Bulacán, Luzon, on the Santa Maria River, three miles from its mouth, six miles northeast of Bulacán. It was almost entirely destroyed during the insurrection, as it was the military centre of the insurrectionists, and was burned by American troops; it is, however, being rebuilt. It is in a productive rice and fruit region, has good roads and is near Manila and the Manila and Dagupan Railroad; there are also facilities for river transportation. Pop. 10,510.

SANTA MARTA, mär'tä, Colombia, capital of the department of Magdalena, stands on the north coast near the mouth of the Magdalena River. The surroundings are attractive but not salubrious. It has a good harbor, is an episcopal see, and has a noteworthy cathedral. Pop. 8,348.

SANTA MAURA, mow'rä, or **LEUCADIA,** Greece, an island of the Ionian group off the western coast, from which it is separated by a strait which was rendered navigable in 1903 by a canal cut through the sand-banks which block the shallow channel. It covers an area of about 180 square miles, is mountainous, the ranges running north and south and terminating in the white cliffs from which the island derives its name. The eastern portion is unproductive; the west and north are fertile, producing vines, pomegranates, olives, citrons, almonds and some corn. The chief source of wealth consists in the bay-salt, about 8,000 tons of which are exported annually. Bee-culture is carried on, but agriculture is the principal industry; navigation and fisheries also occupy a considerable number of the inhabitants. Cape Ducato (q.v.), formerly Leucates, at the extremity of the peninsula on the southwest, is the high rock (200 feet) where once stood a temple of Apollo, also known as Sappho's or the Lover's Leap. It was also the scene of several early Grecian tragedies. Amaxichi is the principal town, on the northeast, with about 6,000 inhabitants. Nearby is the fortress of Santa Maura.

SANTA MONICA, mŏn'ĭ-kạ, Cal., city in Los Angeles County, 15 miles west of the city of Los Angeles, on the Pacific Ocean and on the Southern Pacific and the Southern California railroads. It is a popular summer resort, has excellent bathing and boating and other amusement facilities. It is headquarters for several motion picture companies. There are considerable shipping interests and there is a 1,600-foot concrete pier. The Santa Monica Military Academy is located here. Pop. (1920) 15,252.

SANTA ROSA, rō'sä, Cal., city, county-seat of Sonoma County, on Santa Rosa Creek, and on the Northwestern Pacific, the Southern Pacific and on the Petaluma and Santa Rosa Electric railroads, about 52 miles north by west of San Franciso. Settlements were made in the vicinity about 1850; but the place was not laid out nor incorporated until 1854. It received its name partly from the profusion of roses which are found here all the year. It is situated in a productive agricultural region noted for its fruits, vegetables, grain, etc. It has large stock-raising interests, and considerable attention is given to dairying. The chief industrial establishments are fruit-drying and canning works, flour mills, machine shops, soap works, carriage factory, basalt quarries, wooden factories, stove factories and lumber yards. It suffered severely in the earthquake of 18 April 1906. It contains a convent, experimental botanical gardens (of Luther Burbank), public library, hospitals, county jail, high school, post-office, city hall, etc. Many trees shade the broad streets which are clean and well kept. The educational institutions are the Ursuline Academy, high school, Santa Rosa Ladies' College, the Pacific Methodist College, public and parochial schools, private schools, etc. The city is on level ground, 152 feet above sea-level. There are five banks with deposits aggregating about $500,000. The total value of public property is $750,714. The waterworks are municipally owned. The city is very well built, and is modern in every respect. Pop. (1920) 8,758.

SANTA ROSA, Philippines, pueblo, province of Languna, Luzon, on the west shore of the Bay Lagoon, 20 miles west of Santa Cruz. It is on the main road and on the line of a projected railroad. Pop. 9,450.

SANTA ROSALIA, rō-sä'lē-ä, Mexico, a town in the southern part of the state of Chihuahua, on the Mexican Central Railroad. It is noted for its hot sulphurous springs. Pop. about 8,000.

SANTA TECLA, tä'klä, a picturesque town in Salvador. See NUEVA SAN SALVADOR.

SANTÁL PARGANAS, sän-täl' par-gŭn'-as, India, a district in the Bhagalpur division of Bengal, bounded on the north and partly on the east by the Ganges. Area, 5,456 square miles. The district is named from the Santáls, who form the most characteristic portion of its inhabitants, and are also found elsewhere in India. They are one of the aboriginal races belonging to the Dravidian stock, are dark-colored, and mostly profess a religion of their own, in which the worship of a chief deity and subordinate deities and a sort of ancestor worship play a chief part. They live chiefly by hunting, and are exceedingly fond of flute-playing, dancing and singing. The Church Missionary Society and the Scandinavian Home Mission have succeeded in improving their condition and promoting education among them. The district is crossed by lines of the East India Railway. It contains the old Mohammedan city of Rajmahal on the Ganges and also Deogarh, the Hindu place of pilgrimage. The capital is Dumka. Pop. 5,326. Pop. of district, 1,809,737.

SANTALS, or **SANTHALS.** See SANTAL PARGANAS.

SANTANA, sän-tä'nä, **Pedro,** West Indian soldier and politician: b. Hineha, Santo Domingo, 29 June 1801; d. there, 14 June 1864. He was a lawyer and a wealthy land owner living quietly on his estates until 1844 when the Dominicans revolted against Haiti. He joined their cause, was appointed brigadier by the junta and speedily rose to the chief command of the insurgent army. He was elected President for four years in November 1844 and administered the affairs of the government with great success, endeavoring to promote agricultural interests and to increase the resources of the country. In 1849 he was called to the command of the army, defeated the invader Soulouque, deposed President Jiménez and ruled as dictator until the election of President Báez in October 1849. He was re-elected President in 1853, and again repulsed the invasions of Soulouque in 1855 and 1856. He resigned in 1857 and was succeeded by Báez, but after the revolt of 1858 again assumed the government. He had strongly favored annexation to the United States in 1849 but the movement had been defeated by Báez, and now, in despair of bringing the government to a satisfactory basis, he ceded it to Spain. He was given rank as lieutenant-general in the Spanish army and retired to his estates, but when the insurrection against Spanish authority broke out he marched to Azua, where he at once crushed the rebellion. When, however, the insurrectionary spirit became general he again retired to his estates where he died shortly before the end of Spanish rule. His last days were embittered by the hatred of many of his countrymen who regarded him as a traitor, but he is now generally recognized as a thoroughly honorable and upright man who acted solely from disinterested motives, while his courage is held unquestioned even by his enemies.

SANTANDER, sän-tän-dār', **Francisco de Paula,** Colombian soldier and statesman: b. Rosario de Cúcuta, New Granada, 2 April 1792; d. Bogotá, 5 May 1840. In 1810 he engaged in the war for independence, fought in the ensuing campaign, in 1817–18 was with Bolívar, and assisted the Liberator to gain the battle of Boyacá (7 Aug. 1819). For his services he was promoted general of division. In 1821 he was elected to the Vice-Presidency of Colombia, with Bolívar as President. While the latter was absent in the southern Isthmus and Peru (1822–27), he administered the government with much ability. Re-elected in 1827, he became the leader of the opposition to Bolívar, and when the latter (1828) arrogated to himself dictatorial powers Santander was deposed, and sentenced to death on an unsupported charge of attempted assassination of the dictator; and though the sentence was later commuted to exile, he was deprived of all rank. The Colombian Republic ended in 1831, Santander was elected President of New Granada in 1832, and after the close of his term (1837), served also in the Congress. His administration was one of order and progress, and laid the basis of the Republic of New Granada, the modern Colombia. He was among the wisest leaders of the time, and wrote a justification of his political course in 'Ayuntamientos para las Memorias de Colombia y Nueva Granada' (1837).

SANTANDER, Colombia, a department situated in the north central part of the country, between Venezuela and the Magdalena River. Area, 17,865 square miles. The greater part is occupied by the Eastern Cordillera of the Colombian Andes, which runs lengthwise through the department. The range is cut near the middle by the deep valley of the Sogamoso River. Only the uplands are inhabited; the lowland along the Magdalena is an unhealthful and densely forested wilderness. The chief products are sugar, coffee, cocoa, tobacco, cotton, rice and wheat. The mountains, however, are rich in minerals, including gold, silver, iron, copper and coal. Pop. 400,084.

SANTANDER, Spain, (1) capital of a province of that name, and one of the chief ports of the Peninsula, 207 miles by rail north of Madrid, near the Bay of Biscay. The principal modern buildings are the town-hall, theatre, market, barracks, bull-ring, clubs, civil and military governor's residences, the institute and other schools, custom-house and hospitals. There are numerous open squares and magnificent promenades, notably that of "Paseo del Sardinera," which leads to the bathing establishment. The higher and lower town are direct antipodes in point of architecture and general construction. The cathedral, of Gothic type, has a fine crypt containing a Moorish font. The chief features of the city are its quays and factories. There are ship-yards, paper-works, foundries, extensive breweries, sugar refineries, manufactories of sails, hats, candles, vermicelli, phosphorus, sulphuric acid, fish-curing establishments, etc. The industries, trade and fishing of Santander are flourishing and important. The harbor conditions have been greatly improved. Extensive acreage has been reclaimed from the sea, upon which a fine esplanade has been constructed, with public gardens and a new quay. The principal export is iron ore, in normal years, chiefly sent to Great Britain and Germany. Other exports are wine, flour, provisions, etc. The imports amount to much more, and consist of manufactured articles from England, France, etc., embracing machinery, textiles, foreign produce, timber, petroleum, etc. Women do the lifting of cargoes. Santander was probably the ancient Roman *Portus Blendium.* The town was sacked by Soult in 1808. Pop. 65,046.

(2) The province of Santander, on the north coast of Spain, covers an area of 2,108 square miles. It is enclosed on all sides but the north with lofty summits and traversed by railroads of various kinds. It possesses extensive forests and important mines of iron and lead; it also produces large quantities of grain. The industries of mining, sylviculture and agriculture are steadily improving. Livestock is abundant and valuable, especially in the highlands. Pop. 312,282.

SANTEE (sän-tē) **RIVER.** See WATEREE RIVER.

SANTERRE, săn-tăr, **Antoine Joseph,** French revolutionist: b. Paris, 16 March 1752; d. there, 6 Feb. 1809. He was a brewer by trade and through his wealth and generosity possessed of much influence. His brewery in the Faubourg Saint-Antoine was used as a meeting place for the Jacobins and he exerted much authority over their movements. He commanded a battalion of the national guard in the storming of the Bastille in 1789, was conspicuous in the riots of the Champ de Mars, in the attack on the Tuileries in 1792 and in the insurrection of August in that year. He rose to be commander-in-chief of the national guard and field-marshal. In 1793 at the head of an army of 20,000 men he was defeated at Coron, was recalled and arrested as an Orleanist, and did not gain his release until the fall of Robespierre, after which he retired to private life. There is no evidence to substantiate his classification as one of the extremists of the Revolution. Consult Carro, 'Santerre, sa Vie politique et privée' (1847).

SANTI, săn'tē, **Angelo de,** Italian musician: b. Trieste, 12 July 1847. He was educated in Germany, France and Austria; entered the Society of Jesus in 1863, and was ordained to the priesthood in 1877. From 1877 to 1887 he was director of the Gymnasium, Zara, Dalmatia. Pope Leo XIII called him to the editorial staff of the *Civiltà Cattolica,* with the charge of restoring ecclesiastical music to its former conformity to the spirit of the Church. In 1887 he also became professor of liturgical chant at the seminary of S. Apollinare. With Carlo Respighi, Father Santi founded *Rassegna Gregoriana* in 1902, and in 1909 attended the National Congress of Sacred Music at Pisa. In 1911 he founded a superior school of sacred music at Rome and served on the Pontifical Commission for the Vatican edition of the Gregorian Liturgical books. He has published 'Adolfo Kolping e les Società cattoliche degli artigiani' (1891); 'Ricordo materno,' a novel (1896); 'Le Litanie Lauretane' (1897); 'Studi biografici su Elena Lucrezia Cornaro Piscopia' (1903); 'Il cursus nella liturgia e nella storia litteraria' (1903); 'A Londra, note ed impressioni' (1904); 'Lagrime nuove,' a novel (1909) and contributions to *La Civiltà Cattolica.*

SANTIAGO, săn-tē-ā'gō, capital of the Republic of Chile, situated at the base of the Cardillera of the Andes. It occupies an area of eight square miles in a fertile plain about 2,000 feet above sea-level, and is divided into two districts by the Mapocho River, which is crossed by many iron bridges. The most important part of the city is that which lies between the river and the Alameda de las Delicias a very wide avenue with many rows of fine trees. Cerro Santa Lucia, a hill rising to a height of more than 200 feet above the gabled or flat house tops, is made an attractive place of public resort by gardens and an open-air theatre. Other distinctive features are Cousiño Park and the Agricultural School Farm, each 320 to 330 acres in extent; the former devoted merely to outdoor recreation while the latter is the most useful centre of public instruction in Chile. Established in 1842, this school farm (*Quinta Normal de Agricultura*) now includes the Agricultural Institute and Training School, botanical gardens and conservatories, a zoological garden, the Museum of Natural History, Veterinary Institute, institutes of Vegetable Pathology and Animal Vaccine, and the Chemical Laboratory. Noteworthy buildings are Congreso Nacional, the Moneda (residence of the President of the republic), cathedral and archiepiscopal palace, National Library (160,000 volumes), city hall, Palace of the Courts of Justice, university, National Conservatory of Music, Municipal Theatre, Astronomical Observatory, museum of fine arts (where annual exhibitions of painting and sculpture are held), Central Railway Station, palace of the exposition and many luxurious private residences. Educational institutions include district and private schools, those maintained by religious bodies, the National Institute (secondary instruction), commercial technical institute and professional school for girls. The university provides instruction in medicine (its most important faculty), law, engineering, etc. There are also normal schools, a good school of arts and trades, institute of pedagogy and schools of the fine arts. The board of public hygiene exerts an excellent influence for the control of diseases which were formerly prevalent. The water supply is good and abundant. Santiago has a mild climate: frosts are not unknown, though snow rarely falls. Industrial establishments are flour and wood-working mills, foundries, breweries, tanneries, etc. There are seven national and three foreign banks; electric street cars and a belt-line railway; and railway service for communication with the coast. The state shares with four private companies the task of maintaining the telegraph service. There are two telephone companies. The municipality has an income of about $2,000,000 for public expenditures. On 8 Dec. 1863 the church La Compania was destroyed by fire during service, and about 2,000 out of the 3,000 of the congregation, mostly women, perished, and on 16 Aug. 1906 the city was visited by a severe earthquake, followed by fire. Pop. 397,941. See also CHILE.

SANTIAGO DE LOS CABALLEROS, dā lōs kā-bāl-yā'rōs, Santo Domingo, city, on the Yaqui del Norte River, 80 miles northwest of the city of Santo Domingo, 20 miles south of Puerto Plata. It is connected with Puerto Plata by railroad, and also with the east coast by a continuation of the road originally extending from Sanchez to Concepcion de la Vega. It is situated in the Vega Real, the most fertile agricultural section of Santo Domingo, and is the largest and most prosperous inland city of the country, having extensive commercial interests, especially in tobacco. Pop. about 12,000.

SANTIAGO-DE-COMPOSTELLA, dā-kōm-pōs-tēl'yā, Spain, a city on the Sar, in the province of Coruña, 32 miles south of the city of Coruña, romantically situated on a slope of Monte Pedroso. It is the seat of a university and of an archbishopric. The cathedral, begun 1082 and completed 1128, is in the form of a Latin cross, is well preserved and has a remarkable interior. It is on the site believed to be the grave of the apostle Saint James, whose bones are said to be in the foundation. Other notable buildings are the episcopal palace, the hospital (founded by Ferdinand and Isabella in 1504),

the town-house, the College of Tonseca and the great convent of Saint Martin (overhanging a ravine), formerly one of the wealthiest Benedictine establishments and now a barrack. In the large square or Plaza the bull-fights take place. There are many promenades, fountains and mineral springs in the vicinity, besides pastures and fertile valleys, which produce grain, hemp, fruit, etc. The local industries are distilleries, breweries, soap, chocolate, linen, crystal, paper and small silver articles. There are good schools and a fine library in the university (founded in 1532). Long the most frequented place of pilgrimage in western Europe, the city acquired the popular designation of the «Mecca of Spain.» Pop. about 25,000.

SANTIAGO DE CUBA, dā koo'bā or kū'ba, former name of the largest and most eastern province of Cuba, now Oriente; area, 14,227 square miles. It contains the principal mountain ranges of Cuba, the general trend of which is from southeast to northwest; the river Cauto, the largest river of the island running from east to west, divides the mountain system; the ranges to the north are very confused and irregular; the best defined range is that of the Sierra Maestra, near the southern coast. The valleys and sea-coasts are very fertile; sugar, coffee, cocoa and tobacco are the chief products; bananas and cocoanuts are cultivated, and vegetables and fruits may be raised with little care or supervision. Mahogany, ebony and other valuable hardwoods grow in abundance in the interior, and are exported. Oriente has more mineral wealth than any other province of the island; iron, manganese and copper have long been mined in quantities of commercial importance, and zinc and lead have been found. Good grazing lands abound in portions of the province, and stock raising is an industry of increasing importance. The development of the province was long retarded by lack of transportation facilities, but with the increase of railroads following American occupation, opportunity is afforded for further exploitation of the large resources. Pop. 567,988.

SANTIAGO DE CUBA, chief city of the province formerly of the same name, now Oriente, situated on a fine bay about six miles from the southern or Caribbean coast of the island of Cuba. It is the centre of the mining district, and has a large foreign trade, though the places of business are unpretentious or even shabby. Many of the dwelling-houses are a single story in height; their gardens, the Alameda, some points on the slopes of the surrounding mountains and the shores of the bay are especially attractive. A noteworthy building is the old cathedral, fronting on the Plaza de Armas. The mean temperature in winter is 82° F., and in summer 88°. It was formerly regarded as an exceedingly unhealthful town, yellow fever being prevalent throughout the year; but a marked improvement in this respect was effected through the sanitary reform measures carried out under the direction of the military government (army of the United States) after the war of 1898. The population, as shown by the official census, in 1914, was 62,358. The city has a good water-supply, furnished to 94 per cent of the dwellings, etc., through an aqueduct called El Paso de la Virgen. Santiago was founded in 1514; from 1522 to 1552 it was the capital of the island. It is full of historical interest, the battlefields of San Juan and Caney, the peace tree, and the remains of the Spanish squadron, destroyed outside of the harbor, being of especial interest to Americans. For subsequent events, and especially the important naval and military operations in 1898, consult Marrion Wilcox, 'A Short History of the War with Spain.' See also CUBA.

SANTIAGO DE CUBA, Military and Naval Operations at. For an account of these events of the Spanish-American War, see UNITED STATES, *War with Spain.*

SANTIAGO DEL ESTERO, dĕl ĕs-tā'rō, Argentina, (1) capital of the province of that name, lies in a fertile valley on the right bank of the Rio Dulce. Its chief buildings are the cathedral, national college, normal school, primary schools and bank. It has extensive orchards. The town was founded in 1553. Pop. 12,000.

(2) The province of Santiago del Estero is situated in the north-central part of the republic, covers an area of 55,385 square miles and consists of a broad plain with several low ranges in the west, and a few salt marshes in the south. The streams are the Salado and Dulce rivers. Irrigation is necessary; sugar, corn, wheat, grapes, cotton and tobacco are grown. The chief industries are lumbering, agriculture, stock-raising and wool-weaving. The forests contain valuable woods. The climate is hot. Pop. 247,000.

SANTIAGO DE LAS VEGAS, dā lās vā gās, Cuba, a town in the province of Havana a few miles south of the capital, on the Havana-Guanajay Railroad. The town lies on elevated ground, and is a suitable place for the acclimatization of foreigners. It is regularly built, with two plazas and a handsome church. The tobacco industry is predominant.

SANTIAM, a tribe of the Kalapooian stock of North American Indians formerly residing on Santiam River, a tributary of the Willamette, in Oregon. About 100 are at Grande Ronde reservation, Oregon, when as American citizens they support themselves by agriculture. Consult Lewis, 'Tribes of the Columbia Valley and the Coast of Washington and Oregon' (Lancaster, Pa., 1906).

SANTILLANA, săn-tēl-yā'nā, **Inigo López de Mendoza, Marquis of,** Spanish soldier and poet: b. Carreon de los Condes, Old Castile, 19 Aug. 1398; d. Guadalajara, 25 March 1458, generally known as the Marquis of Santillana. He was of noble family and inherited large estates from his father while still a child. These his mother managed to keep together in a very turbulent and insecure age and to afford the boy the best education possible. He early became a soldier and was mixed up in the civil troubles of Spain and, somewhat later, he distinguished himself in wars against the Moors of Granada. He defended and widened the boundaries of the territory held by the Christians in Spain. At the battle of Olmedo (1445) his success was so signal that it won for him the title of Marquis de Santillana and Conde del Real. He was also given the right to use that title «Don» which was then considered a very high privilege. He followed his

successful political career and soon became the most powerful figure in Castile. At the same time his reputation as a poet and a scientist kept pace with his political advancement; and his fame extended to foreign countries from which came many noted literary men and ambitious students to visit at his home, where all were made welcome. Santillana was one of the most brilliant figures of his age. He distinguished himself in the rough sports and contests of the knights; he was a noted public speaker, a master spirit at the banquet, a natural courtier, a successful and popular leader of men. To all these qualities he added poetic gifts superior to those of most of the Spanish poets of his day. So enthusiastically was he admired by his contemporaries for his poetic gifts and his philosophical studies that he was called the "wisest of the wise." His literary work covers a wide field. He began as an imitator of the ancient troubadours, displaying in his work strong notes of originality. He soon gained a reputation as a writer of sprightly songs and love poems of a true lyrical ring. But among his work of this period are his "serranillas" or mountain songs, a species of poetry which he continued to cultivate later in life with such signal success that the best of his serranillas are still of interest on account of their simplicity, naturalness of tone and poetic beauty of form and expression. He became the master writer of troubadour poetry of his time. In every anthology of Spanish poetry are included "serranillas" of Santillana, many of which are still popular in Spain. He was less successful in gaining popularity for his didactic poetry and his imitation of the Italian poets, especially Dante. He followed the allegorical tendencies of the latter and he was fond of making a display of learning which often amounts to pedantry and detracts from the brilliancy of his poetical talent. Though his fame is greatest as a writer of troubadour poetry, Spanish literary critics agree that he shows more originality and poetic talent in his didactic work. Among his works in this field are 'Diálogo de Bias contra fortuna,' 'Doctrinal de Privados,' 'El Centiloquio.' These show originality greater than that of any contemporary poet. They are graceful, beautiful in form, chaste in language and vigorous in style. It is in his imitation of Dante that his philosophical studies are most seen. His classical and mythological allusions and adornments are so excessive as almost to become a vice. The added fact that everywhere his imitation of Dante is so patent detracts from the actual literary value of this part of his work. But it has a secondary value in that it brought strongly to the attention of Spain the great mine of literary wealth existing in Italy. He introduced into Spain the Italian form of the sonnet and produced excellent imitations of Petrarch. He was also one of the first Spanish writers to dig into the mine of literary wealth of Boccaccio.

Santillana, owing to his popularity, had a large literary following and many imitators, yet he cannot be said to have created a school. His influence on the Spanish language was more general and prolonged than specific and confined to a certain definite time. Among his works, in addition to those already mentioned, are his Vaqueira pastorals, 'Proverbios de gloriosa doctrina e fructuosa ensenanza,' 'Comedieta de Ponza.' Consult Menéndez Pelayo, M., 'Antologia de poetas liricos castellanos' (Madrid 1894); Rios, José Amador de los, 'Obras de Inigo López de Mendoza, Marqués de Santillana' (Madrid 1852); Sanvisenti, B., 'Primi Influssi di Dante, del Petrarca e del Boccaccio sulla letteratura spagnuola' (Milan 1902); and good Spanish literature such as that of Ticknor.

SANTLEY, Charles, Sir, English baritone: b. Liverpool, 1834; d. London, 22 Sept. 1922. He studied music in England and Italy and made his début in opera at Covent Garden in 1857. He won a great success at Hoel in the opera 'Dinorah' in 1859 and in the part of Rhineberg in 'Lurline' in 1860. He was especially devoted to Italian opera and sang in the large capitals of Europe, in Australia and South Africa. He was knighted in 1907. He published 'Student and Singer' (1892); 'The Art of Singing' (1908); 'Reminiscences of my Life' (1909).

SANTO DOMINGO, sän'tō dō-mēng'gō, called also Haiti, the second in size of the West Indian Islands. Its greatest length is about 400 miles; its greatest width 160 miles; its area is estimated at 28,249 square miles. For particulars in regard to physical geography, geology and mineral resources, history, population, etc., see Haiti; and Dominican Republic, the political divisions of the island.

SANTO DOMINGO, Dominican Republic, the capital of the Republic, situated at the embouchure of the Ozama on the south coast. It is regularly built and has a large Gothic cathedral. There is a statue of Columbus in the central square. The city was founded by Bartholomew Columbus in 1496; is the oldest European settlement in America. Pop. 26,000.

SANTO DOMINGO DE BASCO, dā bäs'kō, Philippines, town of the Batanes Islands, province of Cagayan, on the northwest coast of Batan Island. It is the chief town of the group and is well built, with several fine buildings. It has a good anchorage in Santo Domingo Bay; the inhabitants are chiefly engaged in the coasting trade and in fishing. Pop. 2,800.

SANTO TOMÁS, tō-mäs, Philippines, town of the province of Batangas, Luzon, 26 miles north of Batangas. It is on the main road to Manila and on the line of a projected railroad, near the boundary of Laguna. It has good schools. Pop. 9,500.

There is a smaller pueblo of the same name in the province of Union, Luzon, 22 miles south of San Fernando, at the head of the port of Santo Tomás on the main road. Pop. 6,000.

SANTO TOMÁS, a mountain of the Philippines, in the southern part of the province of Union, east of Agoo. It is 7,418 feet in height, the highest peak in the province. On its western side the land slopes rapidly to the coast.

SANTONIN, a proximate principle ($C_{15}H_{18}O_3$), the active principle of santonica, possessing acid properties, obtained from wormseed, the seed of a species of southern wood. It is colorless, crystallizable and soluble in alcohol, and in the fixed and volatile oils, is bitter and is one of the most efficacious vermifuges for roundworms. Its administration produces changes in the urine and also affects the vision for a few hours; but no ill results follow.

SANTORIN, sän-tō-rēn', **THERA,** or **CALLISTE,** Greece, the largest of one of the island groups in the Ægean Archipelago, 60 miles north of Crete. It has an area of 27 square miles. The eastern slope is covered with vineyards; the western shores are precipitous, with deep ravines and volcanic indications. The town occupies the lofty heights overlooking precipices. The wines of the island are the chief staple and are called *vino-brusco* and *vino-santo.* Various eruptions have occurred in the vicinity which from time to time have changed the surrounding topography. There are practically no trees and the water supply often fails, it becoming necessary to procure fresh water from neighboring islands. There are many ancient remains, and excavations have brought to light numerous inscriptions of the Mycene and early periods. Pop. 19,597. Consult von Gaertringen, Hiller et alia, 'Thera, Untersuchungen, Vermessungen und Ausgrabungen in den Jahren 1895–98' (Vols. I–IV, Berlin 1899–1902); and 'Inscriptiones Græcæ Insularum Maris Ægæi' (Vol. II, ib., 1898).

SANTOS, sän'toos, Brazil, city in the state of São Paulo, on the Atlantic Coast, 200 miles southwest of Rio de Janeiro and 45 miles from the city of São Paulo. The immense export and import trade of the interior region which it serves has made it the second port of the republic, the total value of its trade reaching about $251,000,000 annually. The harbor is accessible to the largest vessels. Santos is the largest coffee exporting port in the world, being the outlet for the great coffee-producing *parendas* of São Paulo. Coffee to the value of about $65,000,000 is shipped annually from this port to the United States. The annual export of coffee to all countries from this port has averaged over $120,000,000 for the last 12 years. The chief exports from Santos to foreign countries in 1915 were coffee, valued at $113,424,679; hides, $539,275; cacao, $289,340; bran, $69,754; and tobacco, $24,254. Exports to the United States in the same year totaled $63,055,465, of which coffee represented $62,431,991; hides, $318,817; and cacao, $292,500. Frozen meat is fast becoming an important export, the value now exceeding $2,000,000 annually, Great Britain, Italy and the United States being the chief purchasers. Bananas now rank third in the list of exports, being valued at $500,000 annually and going to Argentina. Santos is situated on an island, protected from the ocean by a larger island, with a channel six miles long between the two. A sea-wall three miles long has been constructed on the side of the city. This made possible the reclaiming of much pestilential and malaria-breeding swamp land, and the city's healthfulness has been greatly benefited in consequence, yellow fever being no longer endemic. The city is well built, has many fine streets and boulevards. Churches crown the heights of Monserrate. There are several monasteries, a city hall, custom-house, two hospitals, an arsenal, banks, electric-lighting plants, electric street railways, gas system and modern water-supply system. A railway connects the city with São Paulo and the interior. Pop. 90,000. Consult Rines, G. E., and Wilcox, M. (eds.), 'Encyclopedia of Latin America' (New York 1917).

SANTOS, sän'tzōz, **Francisco,** Spanish writer: b. in the first half of the 17th century in Madrid; d. about 1700. He published, between 1663 and 1697, 16 volumes, principally of short stories, intended, as the author professes, for popular amusement. 'Dia y noche en Madrid,' the first of this series, contains many excellent and startlingly graphical pictures of life in the capital of Spain. 'Perequillo, el de las guallineras' (Madrid 1668), a story written in opposition to the picaresque novels still extensively read in his day, was also popular and is still read in Spain. 'Verdad en el potro y el Cid resuscitado' (Madrid 1679) is of interest on account of the songs and popular ballads it contains, many of which date back to an early period of Spanish literature, and some of which differ from all other known versions. Among his other popular stories are 'El diablo anda suelto' (Madrid 1677); 'El vivo y el defunto' (Madrid 1692); 'Tarascas de Madrid y tribunal espantoso' (Valencia 1694); and 'Los Gigantones de Madrid.' Few of Santos' stories now appear in their original form because the literary taste of the Spanish people has changed since his day; but they have been recast by other authors and the ideas contained in many of them have been made use of by some of his successors in the literary field. Consult any good history of Spanish literature.

SANTOS CHOCANO, zho'kän-ō, **José,** Peruvian poet: b. 1875. Since the death of Rubén Darío (q.v.) in 1916, Santos Chocano has been the undisputed leader of Latin American literature; and even before the disappearance of the latter from the scene, Santos Chocano had become a figure at least equal in importance with him on the literary horizon. He influenced Darío strongly and for the better, by enlarging his view and making him, in his latter years, more cosmopolitan. It was through Santos Chocano that Darío was led to see the United States and the American people with other and more favorable eyes. Endowed with a broad vision, he threw behind him, early in his career, all sectionalism and local views, which had hampered most of the preceding Latin American poets and prose writers, and announced himself the apostle of cosmopolitanism and Pan-Americanism. At a time when other younger poets like Rubino Blanco Fombona of Venezuela made it their special business to vilify the United States and all things American and to hold her people up to ridicule as uncouth, uncultured, rude dollar-grabbers, overbearing and unbearable, Santos Chocano proclaimed himself the singer of America in all its varying moods and phases, past and present. He sang, 'My lyre has a soul, my song an ideal.' The sound of his lyre was America; the ideal of his song the unity and harmony of all things American. In his 'El Canto del Porvenir' (Song of the Future) he sees the spiritual union of the North and the South, of the Latin and the Saxon. He believes the one is necessary to the other, and that they have been placed together in the Western world for a purpose. Santos Chocano has the truest vision of all the Latin American writers; and his influence, which has

become very widely extended, has been generally exercised for good. His 'Alma America,' in which he emphasizes the idea of race unity on the Western continent, is a stirring poem which became immensely popular and exercised a strong influence on the younger poets of Latin America. Santos Chocano has become, in a sense, the leader of a new school of poetical thought, whose self-imposed task is to sing the beauties and glories of America. Though united through this ideal, the members of this school use widely different literary methods to attain their ends; and some of them are not broad minded enough to see beyond the boundaries of Latin America. Yet all of them can sing with him: "When I feel myself an Inca, I render homage to the Sun which gave me the sceptre of royal power; when I feel my Spanish blood, I evoke Colonial days." Santos Chocano has traveled much and has found a warm welcome in nearly all the Latin American countries. Some years ago he was lionized in Mexico City, and the Central American nations have paid high tribute to his genius. Consult Coester, A., 'The Literary History of Spanish America' (New York 1916); González Blanco, Andrés, 'Select Poems of José Santos Chocano' (Introduction to 'Fiat Lux,' Paris 1908).

SANTOS-DUMONT, dō-môn, **Alberto,** Brazilian aeronaut: b. São Paulo, Brazil, 20 July 1873. He was educated chiefly in France, and has resided in Paris since the death of his father, a coffee planter. Having experimented in aeronautics he made an ascent on 4 July 1898 from the Jardin d'Acclimation, Paris, in a spherical balloon 18 feet in diameter. At this time he was engaged upon the construction of a dirigible balloon which he completed so as to make the trial ascent on 20 September. It proved itself dirigible, but the experiment ended in disaster owing to the insufficiency of the air-pump. A second and a third machine were constructed, the latter being cigar-shaped, 66 feet long and 11½ feet in greatest diameter. It carried a four and one-half horse-power petroleum motor to work a five-foot propeller making 2,500 revolutions a minute. It was steered by a rudder of silk and bamboo having an area of about 25 feet. This machine ascended from Vaugirard, 13 Oct. 1899, sailed to the Champs de Mars, encircled the Eiffel Tower several times, proceeded to Auteuil and finally landed at the manœuvre grounds at Bagatelle. He continued experiments with new balloons, and on 18 Aug. 1901 his balloon collapsed and fell to the roof of the Trocadero Hotel. On 19 Oct. 1901 he won the Henri Deutsche prize of $50,000 offered for a trip from the Aero Club at Saint Cloud around the Eiffel Tower and back to the point of departure in less than an hour. The actual time employed was 29 minutes and 30 seconds, the return being made against a strong wind. In 1902 he went to Monte Carlo with the design of crossing the Mediterranean and after making several ascents suffered an accident which precipitated himself and his balloon into the Bay of Monaco. In 1904 he was made chevalier of the Legion of Honor and five years later became officer. See AERONAUTICS, HISTORY OF —*The Dirigible;* and consult Mr. Santos-Dumont's 'My Airships' (New York 1904).

SANUTO (sän'oo-tō), or **SANUDO, Marin,** THE ELDER, of Torcello, Venetian statesman, traveler and geographer: b. Venice, about 1260; d. 1330–38. He traveled widely, knew the coasts and much of the interior of western, central and southern Europe, northern and eastern Africa, and southern and western Asia. He used his vast knowledge of geography and the trade routes of the world in an effort to reawaken the crusading spirit. To further the plan he wrote in 1303–07 his 'Liber secretorum fidelium super Terræ Sanctæ recuperatione' (Hanover 1611; Eng. trans., London 1896). This he presented to Pope Clement V; and in 1312–21 he was engaged upon two supplementary volumes, which when completed were presented with their predecessor to Pope John XXII, together with maps of the world and of Palestine, as well as the cities of Antioch and Acre, and charts of the Mediterranean and Black Seas and the West European coasts. The maps were probably the work of Pietro Vesconte, and on the whole compare favorably with modern maps. The books contain definite plans for the conquest of Palestine, displaying an extensive knowledge of the customs, wealth, extent and population of the countries described. There are 23 manuscript copies of the 'Secreta' in existence, of which the most important are those in the Riccardian Library, Florence; the British Museum, London; and the Paris National Library.

SANUTO, or SANUDO, Marin, THE YOUNGER, Venetian senator, historian and traveler: b. Venice, 22 May 1466; d. 1533. He was of patrician birth, and at the age of 17 went on a journey through Istria and the mainland provinces. He sought out famous people, places of interest and libraries wherever he went, copied inscriptions and made a careful and exhaustive record of his observations and experiences. Because of his exceptional ability he was elected to the Maggior Consiglio at the age of 20, five years less than the legal age, and in 1598 he became a senator. His diaries begin 1 Jan. 1496 and continue until September 1533, covering the proceedings of the legislative bodies in which he served and giving an exhaustive record of his experiences and associations during that period, filling 58 volumes. He was permitted to examine the secret archives of the state, and his friendships included the most famous and learned men of his time; so that his minute and accurate records, governed by his broad learning and rich associations, are of great value and undisputed authority. He collected a splendid library, including foreign as well as Venetian manuscripts, his activities generally fitting him for the post of historian to the republic, an appointment he greatly desired. This, however, twice passed to others, but Sanuto's services as a historian were eventually recognized by the republic through a yearly pension of 150 gold ducats. He was author of 'Itinario in terre ferma' (London 1847); 'I Commentarii della guerra di Ferrara' (Venice 1829); 'Le Vite dei Dogi' (in Muratori's Rerum Italicarum Scriptores,' (Vol. XXII, 1828); and the 'Diarii' (Venice 1872–1903).

SÃO FRANCISCO, säń frän-sēs'kō, a river of Brazil, which rises in the Serra da Canastra, in the southwest of the state of Minas Geraes, flows north-northeast through that state and the state of Bahia, then turning east forms the boundary between the states of Pernambuco and Alagoas on the north and Bahia and Sergipe on the south. It falls into the Atlantic 50 miles north-northeast of the town of Sergipe by two mouths, one to the north, called Aricari, so shallow as to be scarcely navigable even by canoes; and the other to the south, hence called Francisco do Sul, much larger and deeper, but unfortunately encumbered at its mouth by a large bar about six miles broad, covered with a heavy surf, and with seldom more than four feet of water on it. It is a large and majestic river, with a course which has been estimated at 1,600 miles, but, in addition to the bar at its mouth, has numerous rapids and cataracts, which make its continuous navigation impossible; those at Paulo Affonço, about 190 miles inland, are about 60 miles in length. Its principal affluents are, on the right, the Paraopeba, Guacuhi or Velhas, Jequitahi and Verde; and on the left the Andaia, Borrachudo, Abaité, Paracatu, Urucaia, Carinenha, Correntes and Grande. Railroads have been built around some of the rapids and in conjunction with inland steamers on the river afford continuous communication for about 1,000 miles.

SÃO JOÃO DA BARRA, säń zhō-ooń' dä bär'rä, or **SÃO JOÃO DA PARAHYBA,** Brazil, a town on the Atlantic Coast of the state of Rio de Janeiro, at the northern end of the state. It is the port of Campos, with which it has railroad connection. But since Campos became connected by rail with Rio de Janeiro, São João has lost its importance, as the port is only an open roadstead. Pop. 5,000.

SÃO JOÃO DEL REY, dēl rā'ē, Brazil, a town in the state of Minas Geraes, situated 75 miles southwest of Ouro Preto, on the railroad running west from Barbacena. It was founded as a gold-mining town, but the gold has been exhausted, and the chief wealth of the town now comes from cattle raising and the manufacture of cloth and leather. Pop. 10,000.

SÃO LEOPOLDO, lā-oo-pōl'dō, Brazil, a town in the state of Rio Grande do Sul, situated on the railroad 18 miles north of Porto Alegre. The town has two churches, a Jesuit college and two high schools. It has had a considerable industrial and commercial development. Agriculture, viticulture and cattle-raising are carried on successfully in the surrounding country, and the town manufactures leather-goods. The products of the town have amounted to over $6,000,000 annually, most of them going to Porto Alegre, which, besides the railroad connection, can be reached by steamboats on the Rio dos Sinos. The town was founded by German immigrants in 1824, and most of the inhabitants are still Germans. It was almost totally destroyed during the civil war of 1846. Pop. 7,500.

SÃO LUIZ DE MARANHAO, loo-ēzh dā mā ran yän. See MARANHÃO.

SÃO PAULO, pow'loo, a state of Brazil, bounded on the north and northeast by Minas Geraes and Rio de Janeiro, on the southeast and south by the Atlantic Ocean and Paraná, and on the west by Matto Grosso. Area, 112,307 square miles, including a large section of fertile but unsettled land near the Paraná River, which forms part of the western boundary. The principal mountains are between the capital of the state and Santos, Serra do Mar (average height about 3,000 feet); and, toward the interior, spurs of the Mantequeira range. Adjoining the coast is a comparatively narrow strip or zone, low-lying and tropical in its characteristics; but an abrupt ascent leads from this to the plateau which extends westward to the Paraná, sometimes cut by the valleys of the river system, sometimes rough and mountainous, but in general maintaining an altitude which ensures a temperate climate. In fact, the winters in the southern part of the state are decidedly cold, frosts occurring many times during a single season; and at the capital the temperature occasionally falls below 32° F. The fertile red soil of the plateau is peculiarly adapted to the cultivation of coffee. The railway system of this state, with that of the neighboring Rio de Janeiro (q.v.), is the best in Brazil. A notable piece of engineering is seen on the line which crosses the Cubatão range at a height of more than 2,500 feet. The principal cities are the capital, São Paulo (founded by the Jesuits in 1552, became a city in 1712, created a bishopric in 1746) and the leading port, Santos. The Bulletin of the Pan American Union, April 1919, notes that the population of the city of São Paulo, which in 1900 was 239,820, at the end of 1918 had reached 504,278—an increase of 115 per cent in eighteen years. In 1900 there were 22,407 buildings in the city, valued at 33,306 paper contos (one conto, paper = $270 U. S. gold). In 1918 fully 55,356 buildings were reported, valued at 89,456 contos. Santos (1919 est. 80,000) is built on an island, a narrow channel separating it from the mainland. Its harbor and general sanitary conditions have been improved by important works. It is not only the shipping centre of the State of São Paulo but also ranks as the largest entrepôt of coffee in the world. Two of the main causes of the prosperity of this state—which is generally regarded as the most progressive part of Brazil—are successful agriculture, undertakings to improve the means of communication, and immigration. For description of the coffee industry, cattle-raising, etc., in this state, see BRAZIL—AGRICULTURE AND FOREST PRODUCTS.

MARRION WILCOX.

SÃO THOMÉ, tō-mā', or **SAINT THOMAS,** Africa, an island in the Gulf of Guinea belonging to Portugal, and situated a little north of the equator in long. 6° 30' E., 150 miles northwest of Cape Lopez. Its area is 358 square miles. The whole island consists of a volcanic mountain 7,026 feet high, and heavily forested. The climate is equable, temperate and healthful, and the soil is very fertile. The chief products are coffee, cocoa, oranges, lemons, figs, grapes, pine-apples, vanilla, cinnamon, india-rubber, cinchona, etc. The exports are valued at over $10,000,000 annually. Pop. 53,969. There are nine miles of railway in operation. São Thomé forms, with the neighboring island of Principe, a Portuguese province. The capital is Cidade, with a safe harbor and a pop. of 3,000.

SAÔNE, sōn (ancient, ARAR), France, a river which rises at Viomenil, in the department of Vosges, flows southwest through that depart-

ment, traverses the department of Haute-Saône, and on entering the department of Côte-d'Or, receives the Ognon. Continuing a southwest course, past Auxonne, it receives its most important tributary, the Doubs. It flows past Châlons and Maçon to Lyons, where it joins the Rhone after a course of about 280 miles; of these 190 miles are navigable. The Canal du Centre, Canal de Bourgogne and Rhone and Rhine Canal, bring it into communication with the Loire, Seine, Meuse, Moselle and Rhine.

SAOSHYANT. See Sosiosh.

SAP, the fluid which circulates in plants, and consists of water carrying various nutritive salts in solution. This water and its contents, «crude sap,» so-called, is absorbed by root-hairs and permeates the plant, passing through the woody portions of the vascular bundles, in the newer rings of the «sap-wood,» which, in dicotyledons, constitutes a woody cylinder between the bark and the heart-wood or pith. This sap, by some process which is not fully understood, but which is ascribed to root-pressure, transpiration, or suction, severally or collectively, carries its raw materials to the chlorophyll granules in the green, growing parts of the plant, where they are metamorphosed into organic substances, and are again taken away through the vast cells to those places where they are needed for the life or propagation of the plant, or are stored for future use. Maple and corn sugar, india-rubber, opium and the milk of certain plants are all saps, and the products of the lactiferous cells. Many plants, such as cacti and others, living in desert regions, store away water to carry them through the droughts, a fact which is taken advantage of by travelers in thirsty lands.

SAP-GREEN, a yellowish-green pigment which is prepared by mixing the purplish-red juice expressed from the ripe berries of buckthorn (*Rhamnus catharticus*) with an alkali. The liquid is fermented, evaporated until it has reached a proper consistency, and then suspended in bladders, to harden into a brittle mass. The color is used by water-color painters, paperstainers and leather-dyers, but is very fugitive.

SAPAJOU, or **SAJOU,** a French adaptation of an Indian word, and now applied to several species of American monkeys of the family *Cebidæ*. The sapajous live in flocks in the forests of Brazil, Peru, Guiana, Colombia and Venezuela, and possess tails of feebly prehensile powers, and feed on fruits, eggs, small birds, etc. They are familiar in habits, become soon domesticated, and are thus in favor among mountebanks, etc., who teach these monkeys to become very expert in performing tricks. Common species of sapajous are the sai (*Cebus capucinus*) and white-throated sapajou or sajou (*C. hypoleucos*).

SAPAN, or **SAPPAN-WOOD,** red dyewoods, obtained from two genera of the *Leguminosæ*, but principally from *Cæsalpinia sappan*. This tree is indigenous to tropical Asia and to the Indian Archipelago, but since it gives a good, red dye, similar to that of Brazil-wood, although somewhat difficult to fix, its cultivation is promoted in the West Indies and Brazil.

SAPHO. Of Daudet's 'Parisian Dramas' the most widely read and most intensely poignant is Sapho (1884). Though Edmond de Goncourt pronounced it the author's «most complete, most humane, and most beautiful story,» it owed its popularity not alone to its literary merits, which are very great, but also in part to the fact that it dealt with a phase of life that has often a morbid interest for those who, from whatever cause, are precluded from experience of it. The book is dedicated significantly «To my sons when they are twenty,» to be to them a warning of the perils, spiritual and material, that encompass every attempt to set up domestic life outside of legitimate marriage. Gaussin, a youth of rich promise but weak will, is betrayed by the very generosity of his eager passion into a connection with Fanny Legrand, a woman who lives by and for sex and knows no law or love but the satisfaction of her animal desire, while she clings to Gaussin with the desperation of a last passion. How through the years of this union Gaussin's young ideals, family connections, material prospects, mental powers, moral character were sacrificed, blighted and betrayed; how he was tortured in turn by jealousy and desire, clung yet shrank, rejected, married another and returned to his degradation, only to find his utter sacrifice uncomprehended, because to such as she incomprehensible — all this is shown with relentless psychoanalysis and undeviating seriousness of purpose. No lighter touches relieve the development of the inevitable tragedy, finely allegorized in an unforgettable opening scene, where the ardent young student carries his new-won mistress up the long stairs to his dwelling, first a light burden, gaily borne, then from landing to landing ever heavier, till it bears him down in utter exhaustion at the end. Consult translations by Ives, G. B., Rogerson, T. F. and others.

Benjamin W. Wells.

SAPI-UTAN, a small wild ox of Celebes. See Anoa.

SAPINDACEÆ, săp-ĭn-dā'sē-ē, a family closely allied to the maples, and containing the soap-berry (*Sapindus*), litchi-nut (*Nephelium*), and other genera. The species are usually tall trees or vines with watery juice. The leaves are generally compound, and alternate, evergreen and abruptly pinnate. The flowers are small, but often showy sometimes apetalous, sometimes with four or five unequal and imbricated petals, and about the same number of sepals; the stamens are eight, and are situated on a disc; the ovary is 3-celled, becoming in fruit capsular or indehiscent, or composed of several wing fruits, or a drupe, or nut, or berry. The species are mostly found in warm countries. The fruits of several, such as the *Nephelium*, are eaten, but the leaves of many are poisonous. The typical genus *Sapindus* has a very saponaceous fruit, used in the place of soap. In Brazil, a paste called «guarana» is made from the pounded seeds of the sapindaceous climbing shrub, *Paullinia cupana*, and serves for food, for medicine (since it contains caffeine), and for the preparation of a refreshing drink.

SAPODILLA, or **SAPODILLA PLUM,** an evergreen tree (*Achias sapota*) some 20 feet high with thick, shining leaves, clustered at the ends of the branches and a milky juice. It is sometimes called bully-tree, also, and is indigenous to tropical America, where it is

often cultivated for its fruit which in the West Indies is sometimes called naseberry. The flowers are small and whitish and the sapodilla, the fruit, resembles a russet apple in color and size and has a milky acrid juice, which disappears when over-ripe, leaving the fruit in a sugary condition and with a pleasant, pear-like flavor. It is a valuable food in warm countries. The seeds are large and black and used as an aperient and diuretic. The juice of the sapodilla is made into chewing-gum, the bark is astringent, and employed as a febrifuge (Jamaica bark), and the wood is reddish-brown, hard, heavy and durable.

SAPONIN, a glucoside contained in the roots of *Saponaria officinalis* or soapwort and many other plants; also in the fruit of the horse-chestnut, in quillai-bark or soap-bark, etc. By means of boiling alcohol it is readily extracted from the root of soapwort, the alcohol, as it cools, depositing the saponin as an amorphous sediment. It derives its name from its behavior with water, in which it is soluble in all proportions, yielding an opalescent fluid which froths when shaken like a solution of soap, if even one one-thousandth part of saponin be present. Its solution, or an infusion of soapwort, is sometimes employed in place of a solution of an alkaline soap for cleansing the finer varieties of wool from grease. Many preparations for cleaning kid gloves, etc., derive their virtues from saponin.

SAPOTACEÆ, săp-ō-tā'sē-ē, a large genus of trees and shrubs of the heath tribe, indigenous chiefly to the tropics and principally to the tropical islands. The leaves are entire, alternate and leathery, with flowers clustered in the axils of the leaves, or at the older stem-nodes. The flowers are regular, bisexual, with stamens borne on the corolla, as many, or twice as many, as its lobes; the calyx-lobes are rigid and obtuse, and longer than the corolla-tubes; the fruits are baccate. The *Sapotaceæ* have a milky juice which furnishes true gutta-percha (q.v.). The sapodilla and star apple of the West Indies are fruits produced by this family. The genus *Bassia* contains species valuable for the oils which they yield and the seeds of *Mimusops elengi* also yield oil abundantly. The sapotads are natives chiefly of tropical India, Africa and America; known genera 21, species 212. Consult Gray, 'School and Field Book of Botany' (1875).

SAPPAN-WOOD. See Brazil-wood.

SAPPHIRE, a mineralogical name including all highly colored and transparent varieties of corundum (q.v.), except the red, which is called ruby, an exception confined chiefly to jewelers. Sapphire corundum occurs in three forms — as small, distinct crystals, hexagonal or rhombohedral in various modifications; as transparent portions of ordinary corundum; and at times as nodules or small rounded masses enclosed in ordinary corundum, though distinct. Most gem sapphires are of the first kind; but some fine stones have been cut from material of the two latter kinds, especially in the corundum workings in North Carolina, notably the Culsagee mine in Macon County. Sapphires present almost every variety of color, although blue is the most familiar, deep shades being most valued. Other blue gems occasionally seen are blue tourmaline (called Brazilian sapphire), cyanite and iolite, which is known somewhat as water-sapphire. True sapphires are, however, easily distinguished by their greater hardness (9), and density (3.95 to 4.1). The main sources of sapphire are Ceylon, Cashmere and the Pailin district of Siam, also the Anakie district of Queensland, Australia. In the United States, sapphires are obtained chiefly in Montana; first from the «bars» or low bluffs, of gold-bearing gravel, along the Upper Missouri River, east of Helena and later from a decomposed igneous dike at Yogo Gulch, in Fergus County; also at Rock Creek, Granite County and Dry Cottonwood Creek, Deer Lodge County. The river bars and Rock Creek yield a great variety of rich and delicate colors, as in Queensland, but Yogo Gulch furnishes the deep blue shades most valued and is being worked very extensively. Small and poorly colored stones are largely sold for watch-jewels. All blue and green sapphires, like rubies, possess marked dichroism, a point important to the lapidary, as the tint of gems from such crystals depends upon the direction in which they are cut. In biblical history the sapphire was a stone of an azure color (Exod. xxiv, 10) and very precious (Job xxviii, 16). It was the second stone in the second row of the high priest's breastplate, which is now believed to have been the *lapis lazuli*, and not the modern sapphire, as doubtless was also the stone mentioned in Rev. xxi, 19. Among the Greeks the sapphire was sacred to Jupiter. See Precious Stones.

SAPPHO, săf'ō, Greek poetess: b. Mitylene, or Eresus, Island of Lesbos. She was the greatest of ancient poets of her sex and flourished between 630 and 570 B.C., being a younger contemporary of Alcæus. Little is known certainly of the events of her life. On account of political commotions she left Lesbos for Sicily. But in later years she returned to Mitylene where she became the centre of a female coterie, a school of poetry of which the famous Erinna was a member. She was the author of various poems; hymns, odes, elegies, epigrams — of which only two complete pieces, an ode 'To Aphrodite' and 'To a Maiden,' together with some fragments, have come down to us; these display intense feeling, glowing imagination and a high finish. One of them is quoted in full by Longinus in his treatise 'On the Sublime.' She is said to have invented several metres; at least one still bears her name and has been used by such ancient poets as Horace and such modern ones as Canning in his 'Needy Knife-grinder.' There is an edition of the extant fragments with translations and memoir by H. T. Wharton (3d ed., Chicago 1895). Ancient papyri have recently brought other fragments of Sappho's verse to light. Consult Bergk, 'Poetæ Lyric' (Vol. III, Leipzig 1914); Edmonds, J. M., (in *Classical Review*, Vol. XXII, Vol. XXVIII, London 1909 and 1914); *Classical Quarterly* (Vol. III, ib. 1909); Hunk, A. S. (in *Classical Studies*, Vol. IX, p. 39, ib. 1915) Brandt, P., 'Sappho' (Leipzig 1905); Christ-Schmid, 'Geschichte der Griechischen Literatur' (6th ed., Munich 1912); Farnell, G. S., 'Greek Lyric Poetry' (London 1891); Wright, W. C. 'Short History of Greek Literature' (New York 1907).

SAPPHO. Following the success of his first great tragedy of Fate, 'Die Ahnfrau,' which was written in 16 days, Franz Grillparzer wrote a second poetic drama 'Sappho' (1819), also composed at white heat and resembling 'Die Ahnfrau' in the general character of its poetry although differing from it in form and spirit. In its conception it is half way between the tragedy of fate and the modern tragedy of character; in its form, too, it is half way between the classical and the modern. Out of the slight tradition which tells how Sappho, one of the greatest poets of her age, threw herself from the high Lesbian cliffs into the sea when she found her love for the youth Phaon unrequited and her own handmaiden preferred, Grillparzer has made a stirring drama, with an acting quality strong enough to carry it to success on the stage when well performed. At the same time he has developed a poetic symbolism in the story, and the conflict between the spiritually gifted Sappho and the beautiful Melitta becomes, in Grillparzer's hands, the conflict between art and the pleasures of life. Although the verse has neither the dignity nor the sheer beauty of some of Grillparzer's later work, notably 'Des Meeres und der Liebe Wellen,' it has the cumulative quality which often accompanies verse written in long stretches at a single sitting, a quality which does not detract from its distinctly dramatic value. Through the dignity and the success of his early dramas Grillparzer forged the link that bound the drama of Austria definitely to the literature of Germany.

EDITH J. R. ISAACS.

SAPPHO'S LEAP. See CAPE DUCATO.

SAPRÆMIA. See BLOOD-POISONING.

SAPROLEGNIACEÆ. See FUNGI — *Water Molds.*

SAPROPHYTES, a class of plants living on the carbonic compounds resulting from the decay of organic life. They sometimes contain chlorophyll, but generally do not, and since organs of assimilation are therefore not necessary, the leaves in many kinds are reduced to mere scales. This habit of existing only on decaying organisms makes the higher saprophytic plants very difficult to transplant. Algæ are often saprophytes, making use of the decaying refuse of the sea; and fungi, especially the molds and dung-loving genera as *Splachnum,* are the most generally known cryptogams acting as scavengers in this manner. Even the globular alga, the "red snow" (*Sphærella nivalis*), exists on the corpses of insects, pollen-grains and other decaying materials drifting across the snow. Certain other saprophytes attach themselves to the bark of trees, not to suck the juices of the host in the manner of parasites, but to subsist on the decaying bark and on the organic dust and material in solution washed down by the rain and stopped by the projecting mass of the plants. Many saprophytic plants living in the cracks of rocks have only the humus collected in tiny pockets and the supply of dissolved organic matters in percolating water, to draw upon. Some orchids, as the coral-roots (*Corallorhiza*), that have no true roots, but a thin-skinned rootstock, which absorbs nutriment directly; the familiar Indian pipes (*Monotropa*) and others spring from the humus of decaying leaves, in close connection with the hyphæ of fungi. The meadow pastures support such saprophytes as the true mushroom (*Agaricus campestris*), the moonwort (*Botrychium lunaria*) and the blue and violet flowered gentians. These micro-organisms, non-virulent and always present in animal intestines, may in certain conditions become virulent poisons. See BOTANY; FUNGI.

SAPSUCKER, the popular American name of several small woodpeckers, but properly restricted to the yellow-bellied woodpecker (*Sphyrapicus varius*), an Eastern species represented in the Rocky Mountain region by variety *nuchalis* and along the Pacific Coast by variety *ruber.* This woodpecker is of moderate size; is black and whitish above; black on breast; rump black and white mixed; belly more or less yellowish; sides streaked with dusky; crown red in the adult; chin scarlet and throat black in the male, but both white in the female. This bird illustrates well the curious tendency toward increase of red in plumage toward the Pacific Coast. In variety *nuchalis,* the nuchal band is red instead of brown, extending the chin red by so much; in specimens from Nevada, the scarlet area is still larger; and in the Coast form (*ruber*) the whole head, neck and breast are red, sometimes obliterating the normal pattern. This woodpecker is migratory, spending its summers and breeding only in the cooler parts of the United States and northward, and going South in midwinter. Its habits differ from those of other woodpeckers mainly in its custom of drilling a great number of holes in the bark of trees, to get at and eat the new wood and sugary sap lying beneath it. In many cases serious harm is done to fruit trees by the great number of chains of holes so bored, although many harmful insects are also devoured. See WOODPECKERS, and consult authorities cited thereunder.

SAPUCAIA (săp-oo-kīa) or **PARADISE NUTS,** the seeds of *Lacythis zabucayo,* or sometimes those of *L. ollaria,* belonging to the *Myrtaceæ* and closely allied to the Brazil nut. The trees, often 75 feet high, grow abundantly in the northern part of South America. The nuts which have a sweet almond-like flavor are more wholesome than Brazil nuts. They are about two inches long and an inch thick, with a corky shell furrowed lengthwise, and are found in hard urnshaped fruits, six inches across and with a woody wall half an inch thick. These curious, very hard capsules, have lids which fit closely, but fall off when quite ripe. Like the fruits of other members of the genus they are called monkey-pots, perhaps not only on account of their shape, but because monkeys are said to be very fond of the seeds, which are scarce for this reason. An edible and soap-making oil, which soon grows rancid, is expressed from sapucaia nuts.

SAPULPA, sa-pŭl'uâ, Okla., city and county-seat of Creek County, 102 miles northeast of Oklahoma City, on the Saint Louis and San Francisco Railroad. It is the centre of a region producing oil and natural gas in great quantities and of a rich agricultural region. It has oil refineries, railroad repair shops, glass plants, cotton gins, machine shops and

manufactories of bricks, candy, cigars, ice, oil-well supplies, etc. The city has 10 miles of paved streets, a large passenger railroad station, modern electric light and power plant, an electric street and interurban railway, a water-supply system owned by the city, storm and sanitary sewer system, several churches of the principal religious denominations, fine high school building, four ward schools, manual training and domestic science building, Colored Baptist College and district school, and the Euchee Indian Mission. There are four banks with over $4,000,000 on deposit and two daily and three weekly newspapers. The freight receipts, an index of the city's manufacturing strength, average $3,000,000 annually. Pop. (1920) 11,634.

SARA, sa'ra, Philippines, pueblo, province of Iloilo, Panay; in the district of Concepción, two miles northwest of the town of Concepción. Pop. 11,300.

SARABAND, a dance, said to be derived from the Saracens. Its character is grave and expressive. It originated in Spain, where it was formerly danced to the castanets. Handel, Bach and other masters frequently wrote tunes of this description for the harpsichord or clavichord. It became popular in Europe in the 16th century, but was prohibited for a time in Spain because of its indecency. The name is used now to denote a musical composition written for the saraband.

SARACENIC ARCHITECTURE. See MOHAMMEDAN ART.

SARACENS, săr'a-sĕnz, a people mentioned by Ammianus Marcellinus as inhabiting the northern district of Arabia Felix. At the period of the Crusades the term was employed to designate all infidel nations, against which crusades were preached; and in course of time it became the generic name of all the Arabian tribes who embraced Mohammedanism and extended their conquests in Asia and Africa.

SARAGOSSA, sâr-a-gŏs'a, **Maid of,** Spanish heroine: d. Ceuta, Spain, 1857. Her name was Augustina and she was a vivandière in the Spanish army. During the siege of Saragossa (1808–09) she distinguished herself on several occasions in battle and was made a sub-lieutenant. Her praises are sung by Byron in 'Childe Harold,' canto i, 54–56.

SARAGOSSA, or **ZARAGOZA,** thä-rä-gō' thä (ancient CÆSAR-AUGUSTA), Spain, (1) Capital of a province of its own name and of the ancient kingdom of Aragon, situated on the river Ebro, in a fertile plain, 174 miles northeast of Madrid. The town is highly picturesque with its forest of towers, cupolas and spires, the houses of solid masonry highly ornamented, a city of castles and palaces. Many of the chief buildings were destroyed by the French invaders. Others deserving notice are the exchange (1551); the Torre Nuevo; the old citadel, Aljaperia, built by the Moors; hospitals, numerous churches and charitable institutions, town-house, new university, schools of medicine, theology, etc., many monastic institutions, theatre, bath, museum, bull-ring and botanical gardens and promenades. Agriculture is the principal occupation of the inhabitants and the industries include machinery and iron foundries, tanneries, carriages, preserves, breweries, glass, candles, soap, liqueurs, distilleries and porcelain. Some of the articles referred to are imported besides rice, dried cod, bar-iron, timber and dye-stuffs. The exports consist chiefly of chocolate, paper, cast iron, wool, hats, dyed silks, soap and especially wheat and flour — mainly to Catalonia. Saragossa was the salduba of the Celt-Iberians, but the walls are all that remain of the ancient city. It renounced paganism at an early period and Aulus Prudentius, the first Christian poet, was born here in 348 A.D. It suffered from various wars, and in 1808 sustained two memorable sieges, costing 60,000 lives, but finally capitulated to the French.

(2) The province of Saragossa contains 6,607 square miles. The highest elevation is 7,700 feet. On the northwest are the spurs of the Pyrenees. The Ebro, Jalon, Huerva, Aguas, Arva and Gallego and part of the Aragon are the chief streams. The lower mountain slopes are covered by forests. The soil in the plains is fertile, producing wheat and other cereals, flax, hemp, oil, wine, etc. Silkworms are reared, sheep are bred. The growing industries include paper, leather, soap, brandies, liqueurs, machinery, various kinds of carriages, railway material, pianos, beds, glass, bronze, chocolate, jams, woolen and linen goods and foundries. Several railways and a canal connecting the Atlantic and Mediterranean are the chief ways of communication. Pop. about 433,000.

SARAH (Heb. "Princess"), the daughter of Terah, half sister and wife of Abraham, who in her 90th year bore to him a son, Isaac, according to the promise of God. She died in Hebron at the age of 127 years. See ABRAHAM.

SARANAC (săr'a-năk) **LAKE, N. Y.,** village in Franklin and Essex counties, on Lake Saranac, and on a branch of the New York Central and Hudson River and the Chateaugay railroads, about 70 miles south by east of Malone. The village is in a part of the Adirondack region noted for its healthfulness and the beauty of the scenery. The hunter and lumberman settled here in 1860–70, but the railroad brought the health and pleasure seekers in great numbers. In the vicinity are the Trudeau and the Gabriel sanatoria for consumptive patients. The principal public buildings are the hotels, the churches and the schools. The government is vested in a village president and a board of trustees. Pop. 5,174.

SARATOGA, The, a former wooden sailing ship of the United States navy; displacement, 1,025 tons. Sailing ships of this class are fast disappearing from the navies of the world, but for training the young apprentice into an able-bodied man-o'-war's man there is no better school.

SARATOGA, Battles of, two battles of the American Revolution, called also the battles of Bemis' Heights, or of Stillwater, fought on ground about 12 miles east of Saratoga Springs and near the Hudson River. Both battles were fought under the same officers, the Americans being commanded by Horatio Gates (q.v.), who was ably served by Benedict Arnold and Daniel Morgan (qq.v.), and the British by John Burgoyne (q.v.). The first battle, 19

Sept. 1777, was indecisive. Burgoyne, having crossed the Hudson on the 13th and 14th, and encamped on the heights and plains of Saratoga, confronted Gates' army on Bemis' Heights at Stillwater, which the Americans had strongly fortified. About 4 P.M. on the 19th the American left wing, under Arnold, was attacked by Burgoyne's right. The engagement lasted until dark, and both sides claimed the victory. The British held the field, but Burgoyne had failed in his attempt to flank the American position. The British loss was more than 500 men, while that of the Americans was under 400. Burgoyne, whose communications with Canada were cut off, was now placed in peril through the capture of his supply-boats by Lincoln in his rear. Having reason, however, to expect that Sir Henry Clinton would come up the Hudson to his assistance, he fortified his position and waited. But in view of the non-arrival of Clinton, of the shortness of his own supplies, and of the difficulty of retreat, Burgoyne was forced to risk another battle. Advancing, 7 October, with 1,500 men and six pieces of artillery, he was attacked on the right by Morgan's riflemen and a New Hampshire brigade, while Arnold, without orders, and in defiance of Gates, pressed to the front and assumed actual command of the Americans, leading them in a determined assault upon the British lines. The Americans were reinforced at the critical moment, the British again and again gave way, and the battle ended in their retreat with loss of their artillery. In this engagement the British general Simon Fraser was mortally wounded, and Arnold received a severe wound in the leg. The Americans, animated by success, pursued Burgoyne's men, assaulted furiously, and gained partial possession of their camp. This battle like the first, ended with darkness. During the night, while the American forces lay on their arms, Burgoyne withdrew to the heights in his rear, not far to the north, and on the following day, to avoid capture, he retreated to Saratoga. After vainly waiting again for aid from Clinton, being still nearer the end of his provisions, exposed to the American fire, and finding further retreat impracticable, Burgoyne proposed a cessation of hostilities. He refused Gates' demand for unconditional surrender, and Gates modified the terms, which finally provided that the British should march out with the honors of war, and should freely take passage for England, on condition of not again serving against the American army. Congress failed to ratify this agreement, and the captured British, with the exception of Burgoyne and a few other officers, were held as prisoners until the end of the war. The troops surrendered numbered 5,791. An artillery train of 42 guns, more than 4,500 muskets, and a great quantity of ammunition were taken.

SARATOGA LAKE, a lake in Saratoga County in New York State, about four miles east of Saratoga Springs. It is a favorite place for regattas; it has a straight-away course three miles long and is wide enough to accommodate eight racing sculls abreast. In one of the intercollegiate regattas held here, 16 college crews competed, and had ample room. A steam railroad and electric cars extend from the "Springs" to the lake. In the summer it is a favorite resort for fish and game dinners.

SARATOGA SPRINGS (from an Indian word meaning "Hillside of the Great River"), N. Y., city in Saratoga County, on the Delaware and Hudson, the Boston and Maine and the Adirondack railroads, 38 miles north of Albany and 185 miles north of New York. It is easily accessible to many of the large Eastern cities, the "Saratoga Special" making the run from New York in four hours; Boston may be reached in six hours; Albany and Troy one hour; from Buffalo, Rochester, the Adirondacks, the Green Mountains, the White Mountains and many other places fast trains are run, especially in the summer season. It is a remarkably healthful place and all precautions known are used to keep the water pure and the sewerage system free from defects. The missionaries were the first known white men to visit this region. In 1684 the land now constituting Saratoga Springs and adjacent counties was ceded to the Dutch by the Indians. The first white owner of the now celebrated "Springs" was Rip van Dam, and Sir William Johnson (q.v.) was the first who had the efficacy of the waters tested. In 1774 the first hotel was erected. The "Springs" have made for the place a world-wide reputation. Thousands come to this city each year to use the waters, making the city one of the most popular health resorts in the country. Since 1826 the waters have been bottled and sent to various parts of the world. The Saratoga battlefield, the scene of the surrender of Burgoyne to Gates, 17 Oct. 1777, is 12 miles east of the city.

Saratoga Springs is situated on the southernmost spur of the Adirondacks, at an elevation of more than 300 feet above tide-water. The region around has practically no swamps nor marshes; the rainfall is moderate and the winters cold, the summers mild and pleasant. There are but few manufacturing establishments and the region around is composed largely of productive farms. The mineral springs are about 50 in number, 40 of which are well known. The most frequently visited and the waters of which are most extensively used are the Congress, Vichy, High Rock, Arondack, Hathorn, Patterson, Re-Mo-Ho, Red, Magnetic, Columbian, Geyser and Excelsior. The waters are cathartic, tonic, alterative and diuretic. The springs are in three groups: one about a mile south of the city, one a mile north of the city and the largest number within the corporate limits. The Saratoga Racing Park is a mile from the centre of the city. A paved sidewalk leads to the entrance gates. Polo Park, the golf links ground and other grounds furnish opportunity for outdoor sports. Saratoga Lake (q.v.) is about four miles distant.

The principal public buildings are Convention Hall, which seats 5,000 and which cost $100,000; the town-hall containing the theatre, a State armory and the hotels. The hotels of the city have on several occasions accommodated 40,000 guests. On account of its spacious hotels and its convention halls, it is a favorite place for conventions. There are 18 church buildings, representing eight different denominations. The educational institutions are the Skidmore School of Arts, a high school, public and parish elementary schools, several private schools, a public school library, the McMillan Reading Circle Library and the Athenæum. The charitable institutions are the Saratoga, Saint Faith and Saratoga Cure hospitals, Home of the Good Shepherd, Saint Christina Home and the Children's Home. The State of New York has established a reservation about the mineral springs. It was established in 1909 and is maintained and operated by the State Conservation Commission. Approximately 550 acres of land are included within it. Upon this property are 122 natural springs and wells, including practically every naturally mineralized and naturally carbonated water in the Saratoga region. The purpose of the State in assuming control over the Saratoga springs was to stop their commercial exploitation for carbon dioxide gas and to ensure the flow of their curative waters continuously for the benefit of the public. There are three parks upon the State Reservation, Geyser Park, High Rock Park and Lincoln Park. At three different places upon the State Reservation bath houses are conducted for administering various courses of treatment. They are run in accordance with the highest standards of the medical profession and many of the baths are given only under physicians' prescriptions. At the Lincoln Park bath house are two large, outdoor, fresh-water swimming pools which are well patronized in the summer months. The Saratoga bath house, in the centre of the city, is operated throughout the year, and every treatment may be obtained here. The Lincoln and Washington bath houses are operated all summer and as late into the fall as the demand for them continues. The Washington bath house, erected in 1919, is the largest and most completely equipped mineral-water bath house in the United States, with facilities for every important hydrotherapeutic treatment.

The two banks have a combined capital of $225,000 and a surplus of $200,000. The annual receipts and expenditures are each about $125,000. The hotels expend during the summer season about $40,000 for orchestral music. The city expends a large amount on the streets, keeping them clean and in good repair. Since 1915 the commission form of government has been in operation. In that year a city charter was granted. Pop. (1920) 13,181.

SARATOV, sä-rä'tŏf, Russia, (1) Capital of the government of the same name, on the Volga, 459 miles southeast of Moscow, in a fertile valley, surrounded by lofty hills. It is one of the most important and best-built cities of eastern Russia. It occupies terraced slopes, intersected by ravines, dividing the city into three parts. It contains 30 churches, besides a public library; a fine art gallery; an excellent theatre; a school of drawing; primary and technical schools, and is the seat of several important courts and public offices. There are manufactures of cordage, bells, pottery, tiles, soap, tobacco, textiles, flour, oil, etc. The trade is chiefly transit by the Volga, between Moscow and Astrakhan. The industrial works comprise flour-mills, iron and oil works, works for the manufacture of railway plants, and tobacco factories. There are extensive distilleries and manufactures of liqueurs. Agriculture and gardening are the chief occupation of a section of the population. Pop. 217,418.

(2) A government of southeast Russia, on the Lower Volga, with an area of 32,624 square miles. The surface is diversified by numerous hills with intervening valleys and many streams which with a mild climate and good soil contributes to rich pastures and munificent crops. There is a scarcity of timber. The chief exports are corn, flour, hemp, flax, tobacco, hops and madder. Wheat, oats, rye and tobacco are the principal crops. The mulberry is cultivated for rearing silkworms. Most of the inhabitants are Russians, although there are many Finns, Tatars and Germans, etc. Bee-keeping is a thriving industry. The value of the manufactures is approximately $12,000,000 yearly. The colonists have much improved industry by their labor and example. Pop. 3,156,100.

SARAVOFF, sä-rä'vŏf, **Boris,** Bulgarian soldier, leader in the Macedonian revolutionary committee: b. Turkey, about 1870. He studied in the military academy at Sofia, obtained a lieutenant's commission in the 1st Bulgarian infantry, in 1895 resigned his commission to devote himself to the cause of the Macedonian revolutionists, and performed many daring exploits in that service. His death was frequently reported in the press.

SARAWAK, sä-rä-wäk', Borneo, East Indies, an independent state, governed by an Englishman with the title of rajah, and now under British protection. It is situated on the northwestern side of the island, and its coast extends from Cape Datu on the southwest to Brunei Bay on the northeast, having a length of about 400 miles; the inland boundary is mainly formed by the Dutch territories, while in the northeast is the independent sultanate of Borneo proper, also now under British protection. The area of Sarawak is about 42,000 square miles and the population about 500,000. The shore is generally low and undulating, but immediately behind it the ground rises rapidly and becomes mountainous. The principal rivers are the Rejang, Baram, Batang, Lupar and the Limbang. The climate is equable. The soil is very productive, and sugarcane grows readily even without cultivation. Cloves, nutmegs and cinnamon thrive well; the more important vegetable productions are cocoanuts, rice and sago. Metals, particularly gold, antimony, silver, quicksilver and nickel, are very abundant and are worked to a considerable extent. Diamonds and other precious stones are also found, and excellent coal, favorably situated both for working and shipping. The original inhabitants are Dyaks, but are now intermixed with Malays and Chinese. They had made considerable progress in civilization. Owing to misgovernment and marauding expeditions for the purpose of obtaining slaves and other plunder they were in a wretched condition till Sir James Brooke was appointed rajah by the Sultan of Borneo in return for distinguished services in quelling disturbances and restoring order. Under his mild yet vigorous administration a happy change was produced, and extended its benefits beyond Sarawak to the adjoining territories. Sir James Brooke, who died in 1868, was succeeded by his nephew, Sir Charles Brooke. The exports consist chiefly of gutta-percha, sago, gambier, pepper, dried fish, edible birds' nests and antimony.

The seat of the government is at Kūching, on a river of the same name. It consists of a native and a European town. Pop. est. 25,000. A battery commands the reach immediately below the town, and there a number of Chinese houses have been built. The trade of the town is considerable, and is carried on chiefly in large boats, some of them of 100 tons, which sail annually to Singapore with sago and other productions of the coast, receiving in exchange European goods, Japanese cloths, brass-work, and coarse earthenware, made in China. The revenue is derived chiefly from customs and the opium, gambling, arrack and pawn farms, exemption taxes payable by Malays. There are import duties on tobacco, salt, kerosene, wines, etc., and export duties on sago, gambier, pepper, jungle produce, dried fish, etc. The revenue is $900,000 annually and the expenditure about $750,000. Imports annually amount to about $4,000,000 and exports to $5,500,000. There are military and police forces, the former consisting of 500 Dyaks under an English army officer. There are 23 post offices and wireless stations are located at Sadong, Sibu and Miri. Straits Settlements currency is in use, of which one dollar is equivalent to 58 cents of United States currency. Consult Baring-Gould, S., and Bampfylde, C. A., 'History of Sarawak' (London 1909); Low, Sir H., 'Residence in Sarawak' (ib.); Ranee of Sarawak, 'My Life in Sarawak' (ib. 1913); Roth H. Ling, 'The Natives of Sarawak and British North Borneo' (2 vols., ib. 1896); Saint John, Sir S., 'Life of Sir Charles Brooke, Rajah of Sarawak' (London 1879); 'Rajah Brooke' (ib. 1899).

SARCEY, sär-sā, **Francisque,** French journalist and dramatic critic: b. Dourban, 8 Oct. 1828; d. Paris, 15 May 1899. After several years spent in general journalistic work he became dramatic critic for 'Le Temps' (1867), and in this position, which he held until his death, was a dictator of dramatic criticism, his word being accepted as final by a large part of the public. He was the author of 'The Word and the Thing' (1862); 'Le Siège de Paris' (1871), which reached 30 editions in its first year; 'Etienne Moret' (1875); 'Comédiens et Comédiennes' (1878–84); 'Souvenirs de Jeunesse' (1884); 'Souvenirs d'Age mûr' (1892); 'Quarante Ans de Théatre' (1893).

SARCINA, sär-sī'na, a genus of microscopic fungi, consisting of cubic or prismatic masses, made up generally of 8, 16 or 64 rounded, cubic cells, the faces of each cell being divided into four frustules or projections by two light grooves which cut each other at right angles. Each cell has a diameter of about $\frac{1}{1000}$th to $\frac{1}{1250}$th of a line, and consists either of a completely homogeneous mass only, without nucleus or granulations, or of such a mass with four, sometimes two or three nuclei. The cells are separate from each other by rectangular striæ. Sarcinæ are found sometimes in considerable quantities in the vomitings of persons ill with chronic affections of the stomach, in the fæces of chronic diarrhœa, etc.; they have likewise been detected in the stomachs of rabbits, dogs, tortoises and other animals; in the urine; in the pus of gangrenous abscesses; in the bones, etc. The appearance of sarcinæ in vomitings indicates a particular form of dyspepsia, for which the best-known remedy is sulphate of soda, 10 grains to one dram, dissolved in water, and taken soon after a meal. The genus *Sarcina* is closely allied to that of *Bacterium.* See Bacteria.

SARCINE, hypoxanthine, $C_5H_4N_4O$, a weakly basic organic substance closely related to xanthine and to uric acid. Found in the muscle juice and in many other fluids of the body. Colorless crystalline needles, slightly soluble in cold water, more so in hot. Unites with acids and certain metallic oxides to form compounds many of which are crystalline.

SARCODINA. A class of unicellular organisms (protozoa) that are without an extennal membrane or cell wall. During the active, or vegetative stage of existence they form pseudopodia, processes of the protoplasmic body substance by which locomotion is achieved and food material seized and taken in. For protection many of them construct a shell of lime, silica or chitin though a few cement together fragments of foreign material to form such a test. The common ameba, very similar in general structure to the white blood corpuscles, is usually regarded as a typical representative of the group. It illustrates the simplest forms in that no skeleton or other specialized structures are present although at certain times a temporary cyst wall is formed as a protection against cold or drought, or during spore formation. The character of the pseudopodia and of the shell are the main factors utilized in distinguishing the subdivisions of the class. Certain amebæ are parasitic and are indistinguishable in general structure from the free-living species. They are indeed doubtless descended from slime-inhabiting forms which would require very little physiological modification to adapt themselves to parasitic existence in the intestine.

Most species exhibit under a high power a narrow marginal zone of clear material the hyaline ectoplasm which includes a more fluid granular endoplasm. The latter is in constant movement and contains food particles, noncontractile vacuoles, reserved materials, waste products, and one or more nuclei. The contractile vacuoles are located at the indefinite boundary line between the ecto- and endoplasm. They are, however, rarely found in parasitic species.

Multiplication is ordinarily simple cell division. The periodic encystment is usually accompanied by formation within the cyst of numerous swarm spores by multiple division. In some cases and perhaps always before encystment two individuals come together with an exchange of nuclear substance or complete fusion as a preliminary to the rapid division that produces the numerous spores. Such swarm spores are very minute. In parasitic species they are the elements for the infection of new hosts and this is brought about ordinarily by the transfer of ripe cysts, or less easily of the vegetative state of the organism.

Differentiation of species is very difficult and demands knowledge of the cyst and of details of spore formation. Many amebæ in vegetative form are merely developmental stages of other organisms and even those which are properly members of the group of Sarcodina are so similar that accurate differentiation is not yet possible in most cases.

The parasites of amebic dysentery have been known since 1860 but the form known as *Endamœba coli,* which is believed by the majority of investigators to be harmless, has only recently been clearly differentiated from the pathogenic species *E. histolytica.* Both often occur together in the human intestine. While amebic dysentery is in general a disease of the tropics and subtropics the Mayo Clinic has tabulated within a short period over 500 cases which came from every northern State in the Union and from the Canadian Northwest. Infection in temperate regions is much less frequent than in the tropics where, as in the Philippines, e.g., careful reports show an infection of 37.5 per cent.

The free living Sarcodina fall chiefly in two orders. Among the most abundant of marine animals are the Rhizopoda whose calcareous shells also form large deposits in the rocks. The Radiolaria are equally abundant in the Pacific and connecting oceans as well as in fossil strata. These forms construct a skeleton of silica the form of which is characterized by sharp radiating spicules. The number and variety of these organisms is beyond conception. They form a considerable part of the bottom ooze found in the deep sea everywhere.

Other free living species are abundant in fresh water bodies and in fact occur in almost any moist environment. Recent discoveries have even disclosed the occurrence of enormous numbers of small amebæ in surface soils where they live in conjunction with various types of bacteria and are believed to play an important part in determining the fertility of the soil.

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SARCOMA. See Tumor.

SARCOPHAGUS, originally the name given to a kind of stone that used to be quarried at Assos in the Troad, and which was employed for coffins or tombs: a coffin made of this stone was supposed to possess the property of consuming within a few weeks a dead body laid in it: in Greek *sarkophagos* means flesh-consuming, or flesh-devouring. Sarcophagus is now used only in the sense of coffin or tomb made of stone, or of terra-cotta or concrete as in the case of the highly ornate tombs which are found among the remains of ancient Etrurian art. Some of the sarcophagi found in Egypt are contemporary with the pyramids: the earliest are squared or oblong, the later ones, whether plain or ornamented with reliefs, have the same shape as the swathed mummies. Phœnician sarcophagi were modeled like the mummiform sarcophagi of Egypt, and were of marble or basalt; some of them showed the principal contours of the body. Before cremation of the dead came into general use at Rome, the illustrious dead were deposited in massive sarcophagi; celebrated among these is the tomb of the Scipios; under the empire Roman sarcophagi were very elaborately ornamented after the manner of the Etrurians. In modern times deceased men of great eminence or great wealth are sometimes laid away in stone chests or sarcophagi. Consult Robert, 'Die Antiken Sarkophag reliefs' (Berlin 1897); Strong, 'Roman Sculpture' (London 1907); Fowler, 'Handbook of Greek Archeology' (New York 1909); Myres, 'Handbook of the Cesnola Collection' (New York 1914).

SARCOPSYLLA, a genus of parasitic fleas which bury their heads in the flesh of their hosts and create bad sores. The most noted species is *S. penetrans,* the chigo (q.v.). In our southern States and elsewhere another species, the chicken-flea (*S. gallinacea*), buries itself in the eyelids of domestic fowls.

SARCOSINE, methyl glycocoll, methyl glycine, $CH_2.NHCH_3.COOH$, a substance discovered by Liebig in the decomposition product of the creatine obtained from meat extract. Later made by the action of methyl-amine on monochlor-acetic acid. A colorless crystalline compound easily soluble in water.

SARD, a translucent, reddish-brown variety of chalcedony, extensively used as a ringstone. See Cornelian.

SARDANAPALUS, sär-da-na-pā'lŭs (Assubbani-pal) Assyrian king, ruled 668–625 B.C. He was the eldest son of Esarhaddon, grandson of Sennacherib, and great-grandson of Sargon. His father resigned the throne to him in 668 B.C., reserving only Babylon to himself. The following year the father's death left Sardanapalus sole ruler. Revolts being common upon a change of rulers, the attention of the new Assyrian king was called to the suppression of one in Egypt, where Tirhakah of Ethiopia had overthrown the system of princes tributary to Assyria. Tirhakah was driven southward out of Egypt after a disastrous battle, but his successor renewed the revolt and met with defeat. Thebes was robbed of an immense amount of treasures of art and wealth. Tyre also revolted, but after a prolonged blockade its king submitted. The kings of Arvad, Cilicia and Tabal were put in subjection, and Gyges of Lydia, who besought an alliance with Sardanapalus to aid him against his Cimmerian enemies from the Black Sea region, found he was accepted on terms which implied submission; and when later he assisted Psammetichus in throwing off the Assyrian yoke in Egypt he was destroyed by Sardanapalus. War broke out with Urtaku, king of Elam, who had made a raid upon Accad, ruled by the brother of the Assyrian king. It took a long struggle to complete the subjection of the country but it was accomplished finally during the reign of Teumman, Urtaku's usurping successor. After a great victory near Susa, Urtaku's sons were placed over the kingdom as Assyrian vassals. The decline of the empire began when the king's brother, Samas-sum-ukin (or Shamash-shum-ukin), ruler of Babylon, as vassal-king, instigated a revolt which was so widespreading as to include Elam, Arabia, Egypt, Chaldæa and other Asiatic countries. Egypt alone under Psammetichus secured her independence. Babylon was taken after a long siege and Samas-sum-ukin perished in the flames of his burning palace. Between 646-640 B.C. Elam was subjugated and Susa, after being pillaged, was razed to the ground. Sardanapalus celebrated his victories in Arabia by a triumphal procession through Nineveh.

Assurbanipal figures in classical literature under the name of Sardanapalus and there is described as a mere sensualist. Though cruel and implacable to foes, he was an enlightened despot, and literature and art, particularly architecture, flourished in his reign and attained

their highest degree of perfection. The king collected a famous library of all the known cuneiform tablets. The remains of his splendid palace with its priceless library were excavated at Kuyanjck. The tablets now belong to the British Museum, and form the basis of our present knowledge of the civilization and history of Assyria. Consult Oppert, 'Histoire des Empires de Chaldée et d'Assyrie'; Lenormant, 'Manual d'Histoire Ancienne de l'Orient' (1869); Rawlinson, 'Five Great Monarchies of the Eastern World' (1879); and the works cited of A. H. Sayce (q.v.).

SARDINES (sär'dēnz') **AND SARDINE FISHERIES.** The name sardine is a general one applied to various small fishes of the family *Clupeidæ* as well as, and less correctly, to the young of some of the larger species. «Thus, there are the Spanish sardine of the West Indies and Florida; the California sardine, found along the entire west coast of the United States; the Chile sardine; the oil sardine of India, and the sardines of Japan and New Zealand. But the sardine *par excellence* is the French sardine, so-called from the island of Sardinia, in the Mediterranean, about whose shores the fish are abundant.» The sardine or pilchard (*Clupea* or *Clupanodon pilchardus*) is usually about five or seven inches long, of an olive-green color above and silvery on the sides and below, with very large easily displaced scales, only about 30 of which form a complete longitudinal row. The usual French sardines are the yearling fish of what becomes, when full grown, the pilchard of English fishermen, attaining a length of 8 to 10 inches. Geographically it ranges throughout the Mediterranean; in the Atlantic from Madeira to Ireland and in the North and Baltic seas. They feed on minute crustaceans, larval forms and floating fish-eggs, the only kind of food for which their nearly toothless mouths are adapted. The pilchard spawns throughout the summer in the open sea, laying about 60,000 buoyant eggs. On the coast of Brittany, where the principal fisheries are located, sardines are now caught throughout the summer, and to a less extent at other seasons, exclusively by means of gill-nets of very fine twine and small mesh, which varies to suit the size of the run of fish. These nets are dyed blue, partly to preserve, partly to render them inconspicuous in the water; and the schools of fish are tolled into them by means of a bait made of the salted roes of various fishes, chiefly cod. The nets are operated from small two-masted boats which never go beyond a few miles from the shore. The catch is brought ashore and a portion is consumed fresh, but the bulk is sold to the canning factories.

The fishes, when bought for curing, are first beheaded and then gutted, and sorted according to size. They are then washed in sea-water and dried by being suspended on wire screens, nets or willows in the open air, and are then plunged into a cauldron of boiling olive-oil. For the cheaper grades peanut or cottonseed-oil is used. The sardines are laid in the cauldron on wire gratings, two rows deep, and are kept therein until sufficiently cooked, when they are taken out and allowed to drip, the oil-drippings being carefully collected. They are packed in the tin cases, which are filled with oil, and sealed hermetically. Throughout the process the greatest care is exercised to keep the fish in the best condition. The offal and waste of the sardine-curing industry is sold as manure to the farmers.

The sardine fishery is the most important fishery industry of France, employing before the war about 32,000 fishermen and more than 8,000 boats, and yielding an annual product of about 60,000,000 kilograms of sardines, valued at about 9,000,000 francs. At the last ante bellum enumeration about 15,000 persons were employed in the canning factories with an annual output of 4,000,000 or 5,000,000 boxes. The better grades are consumed in France, but the United States imports French sardines, chiefly of the cheaper grades. Sardines are also packed to a smaller extent elsewhere in Europe, especially in Spain and Portugal.

In the United States a true sardine (*C. cæruleus*) occurs on the coast of California and, judging from the results attained in the canning of small quantities, it promises to rival the French product in delicate flavor and industrial importance. But the principal sardine industry of the United States centres about Eastport, Me., where the young of the herring is packed. These fish are caught chiefly in brush weirs (see POUND-NET FISHING) and are sold to the canneries, where they are treated in general after the French method with some local modifications. Drying rooms or ovens are employed in place of the open air; when ovens are used the fish are not boiled in oil, but are at once sealed; cottonseed-oil is almost universally employed instead of olive-oil; and various labor-saving devices have been introduced. The product is distinctly inferior to the best or even middlegrade French sardine. Various special grades, put up in mustard, tomato sauce and spices, are also packed. The output of the 45 canneries in Maine is about 550,000 cases, valued at about $2,000,000, annually.

Bibliography.— Cunningham, 'Natural History of Marketable Marine Fishes' (London 1896); Fage, 'Recherches sur la Biologie de la Sardine' (in 'Archives de Zoologie,' Paris 1913); Hall, 'Herring Fisheries of Passamaquoddy Bay' (Report United States Fish Commission for 1896); Smith, 'The French Sardine Industry' (1901); 'Statistiques des Peches Maritimes' (Paris); Stevenson, 'Preservation of Fishery Products for Food' (United States Fish Commission Bulletin for 1898). See HERRING.

SARDINIA, sär-dĭn'ĭ-a, **Island of** (Italian, SARDEGNA), in the Mediterranean Sea, south of the island of Corsica, from which it is separated by the Strait of Bonifacio, not quite seven miles wide, extends between lat. 38° 50′ to 41° 15′ N., and long. 8° 5′ to 9° 50′ E. It is 152 miles long from Cape Teulada in the south to Longo Sardo in the north, and has a central breadth of about 66 miles. Its total area is 9,299 square miles divided into two provinces of the kingdom of Italy (q.v.), Cagliari and Sassari, the former comprising the districts of Cagliari, Iglesias, Oristano and Lonusci, and the latter those of Nuoro, Alghero, Ozieri, Sassari and Tempio, named after the principal urban aggregations. The density of the population is 94.7 per square mile. Cagliari (q.v.) (pop. 59,600) is the capital. Before the consolidation of the Italian kingdom in 1861, Sardinia with its surrounding islands, the principal of which are San Antioco, San Pietro, Asinara, Madalena, Tavolara and Caprera formed that part of the Sardinian states named the Kingdom of Sardinia. See SARDINIAN MONARCHY.

Topography.— The island is nearly in the form of a parallelogram. In a prehistoric age it was united with Corsica. The interior is generally mountainous, the great chain which traverses Corsica from north to south being evidently, notwithstanding the interruption of the Strait of Bonifacio, continued into Sardinia, where it usually follows the same direction, but occasionally sends out transverse branches east to west. The culminating point is the peak of Generagentu, situated a little to the east of the centre of the island, which attains the height of 6,132 feet. Between the mountain ridges are several extensive plains, of which the most celebrated for beauty and fertility are those of the Campidano in the south, and of Ozieri in the north. There are several large sandy or stony districts called *macchie*, of a very sterile nature. The streams are numerous, and add considerably to the fertility of the districts through which they pass, but are of no navigable importance. The Tirso, the largest, pours its waters into the Gulf of Oristano on the west coast. The lakes are situated chiefly in the vicinity of the coast, where they form a series of lagoons. Sardinia has a total coast line of 835 miles. The north coast is generally rugged and precipitous, presenting a succession of bold headlands. The principal bay is that of Porto Torres, in the Gulf of Asinara. The west coast is extremely diversified in character, rocky headlands (the principal of which is Cape Argentiera, 5,200 feet high), beaches, low hills, tablelands, open bays and bold islets succeeding each other. Guarding the strait of Bonifacio a group of fortified islands constitutes the naval station of Maddalena. Cape Teulada, nearly 900 feet high, forms the most southerly point of the island. Turning north from Cape Spartivento a number of rocky islets present themselves, lining a low and marshy beach, which continues almost unbroken. The Island of San Macario forms the southwest entrance of the Gulf of Cagliari. This gulf, besides having the capital situated on its northern shore, everywhere furnishes excellent anchorage in ample depth, and in the grounds along and behind it exhibits the best specimens of cultivation of which Sardinia can boast. The east coast, from Cape Carbonara northward, stretches nearly in a straight line, the continuity of which is seldom interrupted by indentations. The most conspicuous of all the headlands is that of Monte Santo, a rugged promontory upward of 2,400 feet high, sloping toward the sea, and terminating in bold precipices of limestone, within which is an extensive cave fantastically adorned with enormous milk-white stalactites.

Geology.— The greater part of the rocks are of crystalline texture and belong to the earliest formations, consisting of granite, overlain by gneiss and mica-schist. Trachyte, basalt and other rocks of volcanic formation are most largely developed in the Northwest, but also occupy a greater number of isolated spots throughout the island, and more especially in the southwest, where the adjacent islands of Saint Pietro and Saint Antioco are almost entirely composed of them. In many cases the mouths of ancient craters and the lava-streams issuing from them can be distinctly traced. Sedimentary Silurian rocks break the continuity of the granite on the east, and a large tract in the southwest belongs to the same formation, extending in a southwest direction till it reaches the southern extremity of the island and forms the remarkable promontory of Teulada. The limestones and chalks at the top of the secondary formation are not largely developed, but occupy a number of isolated tracts both in the interior and on the coast. In the latter portion they form conspicuous objects in the northwest, where the cliffs to the north of the Gulf of Alghero are composed of them, and in the east, where they form the great mass of Monte Santo and contain its celebrated stalactical cave. Tertiary rocks of travertine, marl and sandstone occupy a considerable tract near the town and along the Gulf of Sassari, and also in the south, where they form the eastern boundary of the plain of Campidano. That plain itself, however, has a deep covering of alluvium, which partly accounts for its remarkable fertility. Similar tracts of alluvium, though of much more limited extent, are found in the Plain of Ozieri in the north and along the Gulf of Palmas in the south and that of Paglia in the southwest.

Minerals.— The mineral riches of the island were well known to the ancients, whose extensive workings can still be traced. Tradition enumerates gold among its metals, but no traces of it can now be found. Lead, however, exists in considerable abundance, and is generally highly argentiferous. Mines of it are profusely scattered over various districts. Zinc ore (calamine) is worked, also lead ore; and both are exported. Copper occurs in several quarters and occasionally furnishes beautiful specimens of malachite. Quicksilver has been found and was once partially worked, and both bismuth and antimony are said to exist; iron of excellent quality is plentifully distributed and is worked in several districts. The other mineral products deserving of notice are porphyry, basalt, alabaster, marble, volcanic enamels, rock-crystals and a variety of beautiful pebbles, lignite, gypsum and nitre. Salt, in its mineral form, is found only in the grottoes of Serrenti, but is extensively obtained from the salt-pans along the coast, and forms one of the most profitable sources of royal revenue, for the sake of which it is strictly maintained as a government monopoly. There are about 12,000 engaged in mining, and the island takes fifth place in this industry among the Italian provinces.

Climate.— The climate of Sardinia has for many ages borne a very bad name; at certain seasons large districts become so insalubrious as to be regularly deserted by their inhabitants, while in others the mortality is remarkably great. The range of the thermometer is between 34° and 90° and the mean annual temperature 61° 7″. Hence neither heat nor cold can be said to be in excess. During the hot season, in the low-lying lands, miasmata are continually arising to taint the air, the malignant properties of which become so virulent at night or in the cool of the evening that the natives never quit their homes until an hour after sunrise and hasten to return before sunset, carefully closing every door and window. The disease which then prevails is

known by the name of *intemperie*, and is said to be even more fatal than the malaria by which parts of Italy and Sicily are infested.

Flora and Fauna.— The whole surface of Sardinia has been divided into three portions — one occupied by mountains, where not absolutely barren, is covered with forests or clothed with pasture; one occupied by marshes, lagoons and the almost sterile *macchie*, and one under tolerably regular culture, as arable land, oliveyard, vineyard, etc. See paragraph on *Agriculture*.

Game of all kinds is very abundant. Wild boars, stags, deer and mufflons frequent the woods and forests; and foxes, hares and rabbits are so numerous that their skins furnish a considerable article of export.

Fisheries.— From the extent of seacoast the fisheries naturally form an important branch of industry, which, however, is almost entirely in the hands of strangers. The most valuable fishery is that of the tunny, which is carried on extensively on various parts of the coast. Anchovies and sardines, the latter at one time so numerous as to have derived their name from the island, have become comparatively scarce. Fine mullet, bream, eels and other fish abound, and are staple articles of consumption and commerce. The coral fisheries, more celebrated in ancient than in modern times, are still carried on on the western and southern coasts. The *Pinna nobilis* also, the inhabitant of a shell of from 15 inches to 27 inches in length, abounds in the smooth water of shallow bays, as at Porto-Conte and Liscia, and is the object of an important fishery, partly on account of the pearls, generally of very indifferent quality, obtained from it, and still more on account of its byssus, or tuft of silky hair, which is about eight inches long, and is spun into gloves, stockings or other articles of dress.

Ethnology.— The inhabitants resemble the Spaniards rather than the Italians in character. Their demeanor is grave and dignified compared with the vivacity of the Italians, and they are characterized by their unwavering fidelity to their sovereign, their chivalric sense of honor and their hospitality. They suffered much, however, from long neglect and misgovernment, are ignorant and bigoted, and when they have received an injury are insatiable in their thirst for revenge, but the celebrated blood-feuds are now uncommon and brigandage has ceased. With the exception of the inhabitants of Cagliari and Sassari, the two chief towns of the island, the Sardinians have as yet been little influenced by the modern advances of civilization, and in some remote districts the traveler may imagine himself translated to a period several centuries earlier.

Agriculture.— Much of the land is of remarkable fertility but the system of agriculture pursued is imperfect. The Italian system of partnership or *colonia parziaria*, more especially in *mezzadria*, consisting in a form of partnership between the proprietor and the cultivator, is practised to some extent. The grain raised considerably exceeds the consumption of the present inhabitants, and might easily be increased so as to supply three times the number. The whole operations of the farm are conducted in an antiquated manner. The principal crop is wheat, which is generally of excellent quality, and forms an important article of export in the form not only of grain but of flour, biscuit and macaroni. The culture of barley is more limited and the quality of the produce is comparatively inferior; maize thrives well, and though not yet a general crop is rising rapidly into favor; beans and peas are extensively grown both for home consumption and export. Dairy farming flourishes, the island being second of the Italian provinces in cheese production. The vine is well adapted both to the climate and the soil. The produce, however, is more remarkable for its quantity than its quality, all the preparatory processes being conducted in a careless and imperfect manner. The most esteemed wines are those of the Campidano, Alghero, Sorso and Ogliastro. Beautiful and extensive olive-grounds are met with in various quarters, but the culture might easily be extended and made much more profitable than it has yet proved to be. The best oil is that of Sassari. The only other crops deserving of notice are tobacco, which is grown to some extent in several districts, but particularly around Sassari, Alghero and the adjacent villages; linseed, which is produced in the greatest abundance in the neighborhood of Oristano; cotton, for which the soil and climate of the Campidano appear well adapted; madder, which grows wild in many parts of the island, and, though neglected, might easily be cultivated to great advantage; and silk, well fitted to become a staple product, but at present produced chiefly for amusement.

Industries and Commerce.— Manufactures have made very little progress and are chiefly confined to a few coarse tissues woven by the women at their homes for private use. Tobacco and gunpowder — both, like salt, government monopolies — are manufactured to a considerable extent. Industrial establishments number 4,015, with 34,016 employees, utilizing 13,064 horse power, according to available statistics. The trade consists of the exports of raw produce, the greater part of which have already been enumerated, including corn, wine, brandy, timber, seeds, fish, cattle, lead ore, calamine, salt, tobacco, etc.; the imports include all the ordinary tissues, more especially cotton, colonial produce, hosiery, hardware and metals, hemp and cordage, etc. One great obstacle to the progress of trade was the miserable state of the roads, but good roads have now been made and railway lines constructed. The coinage, weights and measures are the same now as those on the mainland.

Language, Education, Religion, Government, etc.— The language consists of a number of dialects differing widely in many of their roots; several of them closely resemble Spanish. Over 73 per cent of the inhabitants are unable to read or write. There are two universities, one at Cagliari and the other at Sassari. The people are Roman Catholics. Sardinia now has a provincial government similar to the rest of Italy.

History.— The early history of the island is involved in much obscurity. Its prehistoric monuments of the Bronze Age (2000–1800 B.C.) are of considerable archæological interest. Its original inhabitants, according to Cicero of Libyo-Phœnician, and according to Strabo of Tyrrhene extraction, were living independent when, about 530 B.C., they were attacked by the Carthaginians, and obliged, after a valiant but ineffectual resistance, to quit the low country and retire into their mountain fastnesses. During the first Punic War the Romans made strenuous exertions to become masters of the island, and ultimately, on agreeing to make peace, obtained a formal cession of it from the Carthaginians. This cession is mentioned by Livy as one of the causes which led to the second Punic War, in which Rome, though finally victorious, was brought to the brink of ruin by Hannibal. During the struggles between Rome and Carthage, Sardinia often became the theatre of war, and suffered equally from both the powerful states which contended for its possession. At a very early period the inhabitants were converted to Christianity. They passed successively into the hands of the Vandals, the Goths, the Longobards and Saracens. By the united efforts of the Genoese and Pisans the Saracens were ultimately expelled from the island, and then rival claims were set up for it by its liberators themselves. During the disputes that ensued some of the judges or governors succeeded in establishing themselves as independent princes. In 1297 Boniface VIII invested the kings of Aragon with Sardinia, and it continued in the possession of Spain till 1708, when it was taken possession of by the British. In 1713, in terms of the Peace of Utrecht, it was yielded to Austria. In 1720 it was ceded by Austria to Victor Amadeus II, Duke of Savoy, in exchange for Sicily. The Duke of Savoy thereafter assumed the title of king of Sardinia, which was finally exchanged in 1861 for that of king of Italy. Pop. 880,863.

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SARDINIAN MONARCHY, a former south European kingdom, comprising Sardinia (q.v.) and its surrounding islands as the nucleate portion with several dependencies on the Italian mainland, which included the duchy of Savoy, whence came its kings; the principality of Piedmont; the county of Nice; the duchy of Genoa and parts of the duchies of Montferrat and Milan. These latter were divided for administrative purposes into 11 divisions — Turin, Genoa, Chambéry, Alessandria, Coni, Novara, Nice, Annecy, Ivrea, Savona and Vercelli. Previous to the annexation of its territories consequent on the events of 1859 (see ITALY), and the disjunction from it of the duchy of Savoy and the county of Nice, which, in the same year, were ceded to and now form part of France, comprised in the whole an extent of 28,229 square miles, with a population in 1858 of 5,194,807. A new constitution was voluntarily granted by Charles Albert in 1848, under which two legislative chambers were introduced, freedom of the press conceded and important reforms carried through. Catholicism was the religion of the state, but all other forms were tolerated. The last Sardinian king was Victor Emmanuel II, afterward king of Italy, who succeeded to the throne in 1849. The royal title was King of Sardinia, Cyprus and Jerusalem, and Duke of Savoy. The crown-prince was styled Prince of Piedmont.

History.— The country which formed the Sardinian states was known in ancient times in its southern part by the name of Liguria, and in its northern part, bounded on the north by the Pennine and on the west by the Graian and Cottian Alps, by the name of Gallia Cisalpina. Savoy, separated from the other parts, and lying beyond the Alps, was considered as belonging to Gallia Narbonensis. From this remote corner of the territory sprang the present royal house of Italy. In the middle of the 11th century, Humbert, Count of Maurienne, a great vassal of Rudolf III of Burgundy, appears exercising jurisdiction not only over Maurienne, but various other parts of Savoy, the Lower Valais and Aosta. This jurisdiction was extended to the banks of the Po by Humbert's son, Otho, who died in 1060, leaving two sons, who became successively counts of Savoy. Under Amadeus III a long series of changes followed, during which the house of Savoy was sometimes brought to the verge of destruction, and at other times attained to such prosperity as to excite the jealousies or fears of neighboring states. One of the counts, called Peter, ruled from 1263 to 1268. He added the canton of Vaud to his dominions, and in many ways improved the fortunes of his house. Henry III of England, who had married his sister, made him Earl of Richmond, and gave him for residence a palace on the banks of the Thames, which hence took the name of Savoy House. Among Peter's successors the most distinguished are Amadeus V, whose prosperous rule, from 1284 to 1323, procured him the title of Great. Amadeus VIII at the termination of his long reign of 49 years, in 1440, left his successor in possession of territories which gave him a distinguished place among the sovereigns of Europe. Being, however, interposed between France and Germany, they were often made the battlefield on which these great countries met to decide their quarrels. Notwithstanding this disadvantage, the house of Savoy, at the Peace of the Pyrenees in 1659, by which the wars of the French and Spanish monarchies were terminated, after they had raged for nearly 80 years, found itself under Charles Emmanuel II as great and prosperous as ever. He was succeeded in 1675 by Victor Amadeus II, during whose reign war between France and Germany again broke out. Amadeus became almost necessarily involved, but played his part so ably, that at the Peace of Utrecht in 1713 he not only added considerably to his continental possessions but obtained possession and was formally crowned king of Sicily. By a subsequent arrangement he exchanged Sicily for the Island of Sardinia, from which he and his successors took the title of king. On his death in 1730 he was succeeded by Emmanuel III, who became involved in the war of the Spanish Succession and saw his territories laid waste by contending armies. The Peace of Aix-la-

Chapelle compensated him by the addition of several important districts, and his own enlightened administration added greatly to the internal resources of his kingdom. He was succeeded in 1773 by his son Victor Amadeus III, who reigned till the French Revolution broke out; and was succeeded in 1796 by his son Emmanuel IV, who, after seeing his continental dominions overrun by the armies of the French, took refuge in the Island of Sardinia in 1799, and three years after abdicated in favor of his brother Victor Emmanuel, who remained in Sardinia till 1814, when he again fixed the seat of government at Turin. Shortly after the Congress of Vienna added Genoa to his territories. An insurrection led to his abdication in 1821 in favor of his brother, Charles Felix, whose reign of 10 years was marked by some important internal improvements. Having left no male issue, a collateral branch succeeded in the person of Charles Albert, who promulgated the liberal constitution of 1848, the provisions of which are referred to above. The same year saw him at the head of a league intended to expel the Austrians from Italy. The disastrous results led to his abdication in March 1849, in favor of his son, Victor Emmanuel II, and very probably to his death in the following July. Under the government of Victor Emmanuel the cause of progress and liberal institutions steadily advanced, some of the more important of the reforming measures being the establishment of universal toleration in religious matters, the suppression, with a few exceptions, of the monastic houses, and an unfettered freedom accorded to the press in the discussion of political matters. Such a development of liberal principles naturally proved extremely distasteful to Austria, whose arbitrary sway, exercised over the adjoining kingdoms of Lombardy and Venice, presented so marked and glaring a contrast. Frequent aggressive attempts were made by her, and pretexts sought for provoking hostilities with Sardinia; but the flame only burst out finally in 1859, when, in the month of April of that year, the Sardinian territories were invaded by an Austrian army. The war which then ensued ultimately issued in the establishment of the present kingdom of Italy, into which the Sardinian states have all been incorporated, with the exception of the duchy of Savoy and county of Nice, which King Victor Emmanuel was obliged, as before mentioned, to cede to France. (See ITALY). Consult 'Cambridge Modern History,' Vols. V–VI (New York 1908–09); Gallenga, A., 'History of Piedmont' (3 vols., London 1855); Ricotti, 'Storia della monarchia piemontese' (Florence 1861–69); Straforell, G., 'Sardegna' (Turin 1895); Sergi, G., 'La Sardegna' (Turin 1907).

SARDIS, sär'dĭs, Asia Minor, the capital of ancient Lydia, stood at the foot of Mount Timolus (5,906 feet high), two and one-half miles south of Hermus. It was traversed by the Pactolus, which flowed through its marketplace. To-day nothing remains at its site (Sart) but a village and some ancient mounds. It was once a wealthy mart, the luxurious capital of the proverbially rich Crœsus, and carried on an enormous trade between the highlands and the coast. Its principal manufactures were woolen goods and carpets. Its strong citadel was destroyed by the Cimmerian Gauls in the 7th century B.C.; by the Athenians in the 6th; by Antiochus the Great, 215 B.C., and by Timur in 1402. An earthquake overturned it in the reign of Tiberius. Xerxes and Cyrus the Great resided here before entering upon their great expeditions. The ancient cemetery is of vast extent, and there are interesting remains of the tomb of Alyattes and of the temple of Cybele.

SARDONYX, a variety of the mineral quartz, in which layers of sard (q.v.), each of even thickness, alternate with layers of white chalcedony. It was highly prized by the ancients for cameos, intaglios, seal rings and engraved gems.

SARDOU, sär-doo, **Victorien**, French dramatist: b. Paris, 7 Sept. 1831; d. there, 8 Nov. 1908. He was for a time a tutor of philosophy, mathematics and history, but soon began his literary career by writing for reviews and encyclopædias. His first play, 'La Taverne des Etudiants' failed at the Odéon in 1854, and for a time he abandoned the theatre. But ere long he was dramatizing again, and he won a popular success in almost every field of the drama save tragedy. He was elected a member of the academy in 1877. In the long list of titles are 'Les Pattes de Mouche' (1869); 'Les Prés Saint-Gervais' (1862); 'Nos Intimes' (1862); 'Les Vieux Garçons' (1865); 'Séraphine' (1868); 'Patrie' (1869); 'Le Roi Carotte' (1872), an *opéra bouffe*, set by Offenbach; 'Rabagas' (1872); 'L'Oncle Sam' (1873); 'Ferréol' (1875); 'Dora' (1877); 'Les Bourgeois de Pont-d'Arcy' (1878); 'Daniel Rochat' (1880); 'Divorçons' (1880); 'Odette' (1881); 'Fédora' (1882); 'Théodora' (1884); 'La Tosca' (1887); 'Cléopâtre' (1889); the series on the French Revolution, 'Les Merveilleuses,' 'Thermidor' (1891), and 'Robespierre,' the last written for Sir Henry Irving; 'Madame Sans-Gêne' (1893); 'Gismonda' (1894); 'Marcelle' (1896); 'Spiritisme' (1897); and 'Paméla, Marchande de Frivolités' (1898). Several of these from 'Fédora' onward, were specially written for Sarah Bernhardt (q.v.). In his comedy, Sardou revealed rapid movement, witty dialogue, frequently clever satire on contemporary matters, unconvincing character portraiture, loose construction and improbable episodes. His "historical" dramas aimed at the heroic, but were simply grandiose, their connection with authentic history being generally tenuous, their interest largely one of empty mechanical display. The last specimen, 'Dante,' presented in the United States by Irving in 1903–04, suffered from a lack of coherence. Sardou's dramaturgic skill was great, but his works had no literary value. Consult Montegut in the 'Revue des Deux Mondes' (1877); Matthews, 'French Dramatists' (1888); Sarrazin, 'Das moderne Drama der Franzosen' (1888); Doumic, 'Ecrivains d'aujourdhui' (1895).

SARGASSUM, the most highly organized genus of the marine algæ, *Fulcaceæ*, or rock weeds. They are seaweeds which are either attached to stones by a discoid hold-fast or are floating, with long filiform stems, much branched and bearing long, narrow, leaf-like fronds with distinct midribs. The air-bladders are little, stalked globes, with slender projecting tips, and stand out from the axils of the fronds, like solitary grapes. It is to this characteristic that the generic name remotely refers and which has given rise to the common names, tropical grapes and grape-weed. Sargasso stems are much employed in South America under the name of goitre-sticks, for the cure of goitre. *Sargassum bacciferum* is the famous gulf-weed, which forms rafts or islands floating together on vast areas of the various oceans and called "sargasso seas." The one lying in the North Atlantic Ocean, between the Azores and the Antilles (roughly 20° to 38° north latitude and 30° to 65° west longitude), its exact position being determined by the central whirl of the Gulf Stream, is so dense as to be often a hindrance to navigation. It covers a territory nearly equal to the European continent and was discovered by Columbus on his first voyage, he and the succeeding Spanish navigators calling it the Mar de Sargaço; it is connected by a narrow belt with a smaller sea between the Bermudas and the Bahamas. There is still another sea in the Pacific and one in the Antarctic Ocean. It is a disputed question whether the weeds have been torn from the shore and blown to their final resting place or whether they live and propagate themselves on the high seas. At any rate these floating islands furnish a permanent home to many small pelagic animals and of predaceous animals seeking them as food.

SARGENT, Dudley Allen, American educator, lecturer and director of physical training: b. Belfast, Me., 28 Sept. 1849. In 1875 he was graduated at Bowdoin College and in 1878 received the degree of M.D. at Yale University. From 1879 he was director of the Hemenway Gymnasium at Harvard University and from 1879 to 1889 was assistant professor of physical training at Harvard. In 1881–1916 he was director of the Normal School of Physical Training at Cambridge, Mass., and since 1916 has been president of its successor — the Sargent School for Physical Education. In 1907–16, Dr. Sargent was president of the Health Education League. He is the inventor of modern gymnasium apparatus, of the Sargent Anthropometric charts, and has published 'Universal Test for Strength, Speed and Endurance' (1902); 'Health, Strength and Power' (1904); 'Physical Education' (1906); also numerous articles and papers on physical education.

SARGENT, Epes, American poet and dramatist: b. Gloucester, Mass., 27 Sept. 1813; d. Boston, Mass., 31 Dec. 1880. He was educated at Harvard, was for a time connected with newspapers in Boston and New York, and in 1836 began writing for the stage. His plays include the 'Bride of Genoa'; 'Change makes Change'; 'Velasco,' and 'The Priestess.' He published 'Songs of the Sea' (1847); 'Poems' (1858); 'The Woman who Dared' (1869); his most noted lyric being 'A Life on the Ocean Wave.' His novels include 'Wealth and Worth' (1840); 'What's to be Done' (1841); 'Fleetwood' (1845); 'Peculiar: A Tale of the Great Transition' (1863). Still other works are 'Life of Henry Clay' (1843); 'American Adventure by Land and Sea' (1847); 'The Critic Criticised' (1856); 'Arctic Adventures by Sea and Land' (1857); 'Original Dialogues' (1861); and posthumously 'Cyclopædia of English and American Poetry' (1883).

SARGENT, Frank Pierce, American labor leader and government official: b. East Orange, Vt., 18 Nov. 1854; d. 1908. He was engaged in various occupations until 1880, when he became fireman on the Southern Pacific Railroad. He was chief of the Brotherhood of Locomotive Firemen in 1885–1902 and was prominent in the strikes of 1892–94. He gained the reputation of a forceful leader for the firemen, and at the same time was notable for his moderation and reasonable methods of dealing with employers. He was offered appointments as member of the Industrial Commission and as director of the Bureau of Printing and Engraving by President McKinley, but declined because of his desire to remain with the brotherhood. In 1902, however, he accepted President Roosevelt's appointment of him as Commissioner-General of Immigration, an office he occupied until his death.

SARGENT, Henry, American artist and soldier: b. Gloucester, Mass., 25 Nov. 1770; d. Boston, Mass., 21 Feb. 1845. He studied art in England in 1793–97. In 1799 he entered the United States army, was aide-de-camp to the governor of Massachusetts with rank as colonel in the War of 1812, and later adjutant-general. He served two terms in the legislature and afterward resumed his profession. His first painting, 'The Landing of the Pilgrims,' was ruined by being rolled on a pole of fresh pine, but the work of the same name at Pilgrim Hall, Plymouth, Mass., is said to be a reproduction of the destroyed work. His other paintings include 'Christ Entering into Jerusalem'; 'The Starved Apothecary'; 'The Tailor's News'; 'The Dinner Party'; a full length portrait of Peter Faneuil at Faneuil Hall, Boston, etc.

SARGENT, Herbert Howland, American soldier and military historian: b. Carlinville, Ill., 29 Sept. 1858. He was graduated at Blackburn University, 1878, and at the United States Military Academy in 1883. He was commissioned second lieutenant, Second Cavalry, 13 June 1883; first lieutenant, 19 June 1890; captain, 2 March 1899; major, 8 Jan. 1909. He served as professor of military science at the University of Illinois, 1886–87, and served on frontier. At the outbreak of the Spanish-American War he was ordered to Washington to help organize volunteer forces and was colonel of the Fifth United States Volunteer Infantry, 20 May 1898–31 May 1899. He organized a regiment at Columbus, Miss.; served at Santiago and Guantánamo, Cuba, under Gen. Leonard Wood, and as lieutenant-colonel of the 29th United States Volunteer Infantry 5 July 1899 to 10 May 1901. He fought insurgents in the Philippines and commanded attacking forces 19 Dec. 1899 at the battle of San Mateo in which Major-General Lawton was killed. He was recommended by Generals Wood and Otis for brevets for meritorious service in Cuba and Philippines, 1898–99. He was professor of military science and tactics at the Agricultural and Mechanical College of Texas, 1903–07, and graduated at the Army War College in 1909. He retired November 1911. On 27 June 1917 he was recalled to active duty and until 25 Sept. 1917 was assistant to the quartermaster's department of the Western Department, after

which he was professor of military science and tactics at Princeton University. He has written 'Napoleon Bonaparte's First Campaign' (1893); 'The Campaign of Marengo' (1897); 'The Campaign of Santiago de Cuba' (1907). He was ordered to Washington in November 1907 from South Dakota, where he was taking part in an Indian campaign to receive from President Roosevelt in person an especial compliment on his history of the campaign of Santiago de Cuba.

SARGENT, John Singer, American painter: b. of American parents, Florence, Italy, 1856. He was educated in Italy, France and Germany, and received his early art training under Carolus Duran. He was elected member of the Royal Academy of England in 1891 and of the National Academy of Design, New York, in 1897. He has lived abroad all his life and has never spent more than a year in the country of his parents. Having had the advantage of being chosen by Carolus Duran as an assistant in the execution of important government commissions, he thoroughly mastered the secrets of French technique before adopting a method and style which are purely his own. His chief works are in portrait and genre. Among his portraits may be mentioned that of 'Carolus Duran'; 'General Leonard Wood'; 'Mr. Joseph Jefferson'; 'Major Francis Lee Higginson'; 'Homer Saint Gaudens'; 'President Roosevelt'; 'Henry G. Marquand'; 'William M. Chase'; 'Carmencita'; 'Ada Rehan.' His genres include 'Fishing for Oysters at Cancale'; 'Neapolitan Children Bathing'; 'El Jaleo.' His most ambitious and original works, however, are the decorations in the Boston Library, which include the now famous 'Frieze of the Prophets.' As a painter his manner is French in brilliant versatility and epigram, but his treatment infinitely superior to the millinery effects of Duran and his school. His portraits reflect clearly the characteristics of his sitter and his intuition is unerring in detecting the subtilest traits of individuality. As a specimen of his wall-painting we may cite that portion of the Boston Library decorations known as the 'Dogma of the Redemption.' It is divided into an upper and a lower panel which would seem to represent Heaven and Earth severally. In the upper panel are the three persons of the Trinity enthroned, with hands raised in blessing, the Father wearing the triple crown, or tiara; each enrobed in a flowing, cope-like garment. In the centre of this picture is set up the cross on which Christ is suffering, while Adam and Eve catch in chalices of gold the blood that drips from his hands. Below the foot of the cross is the pelican, symbol of self-sacrificing love. Above the arms of the cross runs the inscription *Remissa sunt peccata mundi* ("The sins of the world have been remitted"). Across the molding which separates the two divisions of the subject is a monkish distich.

Factus homo factor hominis, factique redemptor,
Redimo, corporeus corpora, corda deus.
(I, man's maker, now made man, and redeemer of him I made, God in flesh, redeem all human hearts and bodies.)

In the lower panel are angels bearing the instruments of the passion, namely, the reed, the nails, the spear, the pillar of scourging and the scourge, the crown of thorns and the ladder. The work has all the pomp and dignity of Byzantine conventionalism, and for richness of color and splendor of arrangement is one of the most impressive of this magnificent series. It is deeply devotional in tone and must be looked upon as among the finest Christian painting of the period. In 1910 Sargent practically abandoned portraiture for landscapes and genre subjects. Among his later oil paintings are 'The Weavers' (1913); 'Cypresses and Pines' and 'The Courtyard' (1914). A notable exhibition of his water-color drawings was held in London and New York in 1912, from which the Boston Museum acquired 45 and the Brooklyn Museum 83 examples.

SARGENT, Winthrop, American soldier and Territorial governor: b. Gloucester, Mass., 1 May 1753; d. New Orleans, La., 3 June 1820. He was graduated at Harvard in 1771 and in 1775 entered the Revolutionary army, serving through the war and attaining rank of major. He was interested in the development of the West, became associated with the Ohio Land Company in 1786 and was soon afterward appointed surveyor-general of the Northwest Territory. In 1787 he became its secretary and in 1798–1801 he was governor of the Territory. He served in the Indian Wars of 1791 and 1794–95. He was a member of the American Academy of Arts and Sciences. Author of 'Papers Relating to Certain American Antiquities' (1796); 'Boston,' a poem (1803).

SARGENT, Winthrop, American lawyer and author, grandson of the preceding: b. Philadelphia, Pa., 23 Sept. 1825; d. Paris, France, 18 May 1870. He was graduated at the University of Pennsylvania in 1845 and at the Harvard Law School in 1847, practised law for a short time in Philadelphia and later settled in New York. He was well known in the periodical press as a writer on history and genealogy. Author of 'History of an Expedition against Fort Duquesne in 1775, under Major-General Braddock' (1855); 'The Loyalist Party of the Revolution' (1857); 'Life and Career of Major John André' (1861); 'Les États Confédérés et de l'esclavage' (1864), etc.

SARGON, sär'gŏn, a king of Assyria, successor of Shalmaneser, reigned from 722 to 705 B.C. See ASSYRIA.

SARK, särk, the "Pearl of the Channel Islands," situated seven miles east of Guernsey and 13 miles northwest of Jersey, is about three and one-half miles in length and one and one-half in extreme breadth. It is surrounded by inaccessible rocks, the chief landing-place, Creux (hole) Harbor, being on the east coast, where a cave has been enlarged and tunneled through the cliff to give access to the interior. The island consists of two portions, Great Sark and Little Sark, connected by a high and rocky isthmus, called the Coupée, narrowing to the width of only a few feet. On the west is the small islet of Brecqhou. Sark is annually visited by several thousand tourists owing to its interesting and picturesque scenery and numerous romantic caves. The inhabitants are chiefly engaged in fishing and agriculture. Sark is administered as a dependency of Guernsey.

SARMATIA, sär-mā'shĭ-a, a name given by the Romans to the country between the Vistula and the Caspian Sea and corresponding largely to central and southern Russia. The inhabitants were known to the Greeks as Sauromatæ and to the Romans as Sarmatæ. See SARMATIAN.

SARMATIAN, the name of a people inhabiting the region known as Sarmatia, who were persistent enemies of the Romans. The Sarmatians were of Aryan origin, excellent horsemen and fierce fighters. The modern Russians are probably descended in part from Sarmatians who remained in their native land and did not fall victims, therefore, to Roman or Goth.

SARMIENTO, Domingo Faustino, Argentine statesman: b. San Juan, Argentina, 15 Feb. 1811; d. Asunción, Paraguay, 11 Sept. 1888. In 1829 he fought in the insurrection against Rosas and was obliged to flee to Chile, but returned in 1836. He was again obliged to leave the country, and going a second time to Chile he established a normal school at Copiapo. He traveled in the United States and Europe 1845–47 studying modern educational systems. Returning to Argentina in 1851 he helped overthrow Rosas and in 1856 organized a department of public education of which he was the head. He was Minister to the United States 1861–68 and President of Argentina 1868–74, giving the country one of the most successful and progressive administrations it ever had. Sarmiento established schools and colleges throughout Argentina and founded a national observatory. He was the author of 'Popular Education' (1848); 'Vida de Abrán Lincoln' (1866); 'Life of Quiroga'; 'Civilizacion y barbarie'; 'Las escuelos, base de la prosperida en los Estados Unidos' (1868). See ARGENTINA.

SARMIENTO GAMBOA, sär-mē-ĕn'tō gäm-bō'ä, **Pedro de,** Spanish mariner: b. Galicia, Spain, about 1530; d. there, about 1590. He was in command of the naval station in the Pacific in 1578 and in 1579 was ordered by the viceroy to take possession of the Straits of Magellan for the purpose of intercepting Drake, then engaged in his depredations off the coasts of Peru and Mexico. Drake evaded him, returning by way of the Cape of Good Hope, and after waiting for several months he explored the coast and returned to Spain in 1580. In 1581 he was sent by Philip II, with a fleet of 24 vessels, to fortify the Straits, holding joint command of the expedition with Diego Flores. The latter became jealous of Sarmiento and deserted him, taking 12 vessels, which left Sarmiento with but four, eight having been previously destroyed in a storm. In 1583 he founded San Felipe (Port Famine), garrisoned it with 300 men and in 1584 sailed for Europe, but was captured by the English and imprisoned until 1588. His colony lost all but two of its members by starvation, one being rescued by Cavendish in 1587 and another by Meriche in 1589. After his liberation he endeavored to secure redress for his treatment by Flores, but his complaint was neglected and he died in poverty.

SARNIA, sär'nĭ-a, Canada, town, port of entry and county-seat of Lambton County, Ontario, on the river Saint Clair, near Lake Huron, and on the Grand Trunk and Lake Erie and Detroit River railways, opposite Port Huron, Mich., with which it is connected by ferry and by the famous Saint Clair tunnel, two and one-quarter miles long, built and operated by the Grand Trunk Railway. Sarnia has a good trade in grain and livestock and oil and salt refineries, tanneries, breweries, foundries and machine shops, flour and saw mills, and manufactories of carriages, agricultural implements, woolens, wooden-ware, etc. It is lighted by gas and electricity and has a good water system. Pop. (1921) 14,637.

SAROLEA, sa'rō-lā', **Maurice,** Belgian educator, war correspondent, editor and author: b. Tongres, 25 Oct. 1870. He was educated at the University of Liége and later studied at Paris, Palerno and Naples. He traveled in North Africa, America, the Caucasus and the Near East, and since 1894 has been first lecturer and head of the French and romance department at the University of Edinburgh. He was Belgian consul at Edinburgh from 1901, and founded and was editor of *Everyman* in 1912–17. He became war correspondent of the *Daily Chronicle* in 1914 and at the close of 1918 had raised $300,000 for Belgian relief. He is general editor of the Collections Nelson and Gallia. Author of 'H. Ibsen' (1891); 'La Liberté et le Déterminisme' (1893); 'The Russian Revolution' (1905); 'The Balkan Question' (1906); 'Victor Hugo' (1911); 'How Belgium Saved Europe' (1916); 'Nurse Cavell' (1916); 'German Problems and Personalities' (1917); 'La Reveil de la France' (1918), etc.

SARONIC GULF (SINUS SARONICUS), Greece, the ancient name of the Gulf of Ægina. See ÆGINA.

SAROS, sā'rŏs, *in astronomy,* an ancient Assyrian period, the origin and exact length of which are unknown, though they have been the subject of much disputation. By some authors the saros has been confounded with the Metonic cycle.

SARPEDON, sär-pē'dŏn, one of the heroes of the Iliad, slain by Patroclus at the siege of Troy. His grandfather of the same name is represented in Grecian mythology as the son of Zeus and Europa, who founded a kingdom in Lycia.

SARPI, sär'pē, **Paolo,** Italian historian: b. Venice, 14 Aug. 1552; d. 14 Jan. 1622. He entered young into the religious order of the Servites and was appointed chaplain to the Grand Duke of Mantua and lecturer on the canon law. After two years he returned to Venice and became provincial of his order (1578). He was afterward made procurator-general of the Servites (1585). His leanings toward Protestantism and his intercourse with Protestant leaders brought on him the imputation of favoring heresy, if not of being a heretic. In a dispute between the Pope and the Venetian government on the subject of ecclesiastical matters Father Paul showed himself a strenuous advocate of Venice and was summoned to Rome to answer for his conduct, but the affair was compromised. His political enemies attempted to assassinate him in 1607, on which occasion he received many dangerous wounds. Father Paul employed the latter part of his life in writing the history of the Council of Trent, a work which has proved of little historical value and is now accounted to be

untrustworthy on account of its extreme and evident partisanship. His labors extended to diverse branches of knowledge; he was skilled in the canon law, and was also distinguished for his acquaintance with anatomy. He appears to have discovered the valves of the veins which facilitate the circulation of the blood. His 'Istoria del Concilio Tridentino' was first published in London in 1619, having been transmitted to that country through the medium of the British resident at Venice, Sir Henry Wotton, a personal friend of the author. This work is strongly anti-papal, nay, even rationalistic in tone and was answered by a voluminous work on the same subject by the Jesuit Pallavicino. The works of Father Paul were printed at Verona 1761 (8 vols.) and at Naples 1790 (24 vols.). His life has been written in Italian by Bianchi-Giovini (1836), and in English by A. Robertson (1894). Consult also *Atlantic Monthly* (January and February 1904); Trollope, T. A., 'Paul the Pope and Paul the Friar' (1860).

SARRACENIA, sär-a-sē'nĭ-a, a genus of carnivorous plants, of about eight species, growing in bogs in eastern North America and named in honor of Dr. J. A. Sarracin. They have peculiar large nodding flowers solitary on their scapes. The five sepals are bracted at the base and the five fiddle-shaped petals are purple, brown or yellow and hang about a style which is dilated at the apex until it resembles an inverted umbrella, with five rays, terminating in hooked stigmas under the angles. The anthers are grouped about the base of the styles. The three- to five-celled ovary becomes a colored capsule in fruit. The name «side-saddle flower» has been given because of its resemblance to a pillion. The origin of the other vernacular names — pitcher plant, trumpet leaf or huntsman's horn — is very evident, for the leaves are hollow and with a lid more or less erect.

These leaves are dispersed in rosettes and are very curiously adapted, in the several species, for entrapping and digesting insects. The most common species is *Sarracenia purpurea,* which has tubular leaves, inflated at the middle and contracted at the orifice, where a heart-shaped wing, curved somewhat like a scoop, joins the hollow leaf. Another ribbon-like wing, starting from the base of the leaf, extends along the concave surface of the tube to the orifice. The whole pitcher-like leaf is green, veined with reddish purple. The scoop-like wing at the summit of the leaf catches rain-water and deflects it into the pitcher, which is often half-filled. The inside of the scoop is lined with glandular hairs which secrete honey, and the whole inner surface of the pitcher is lined with stiff spinous bristles, slippery and pointing downward, and the nearer the base the longer the points become. The reason for this apparatus appears when insects are attracted to the Sarracenia by the honey secreted in the hood-like wing. Some fly to it, some crawl up from the ground, helping themselves to climb by the longitudinal wing. Once there they feed on the honey, but if they carelessly stray from the wing to the orifice, where the slippery bristles begin, they promptly fall into the water collected in the pitcher. In spite of their struggles they can never crawl up past the relentless chevaux-de-frise of glassy, down-pointed teeth, and ultimately drown in the liquid. So many sometimes meet this tragic death that the putrid odor arising from the pitcher is offensive. Just what happens to the decaying bodies does not seem to be certain. Other carnivorous plants digest their victims with acid secretions and pepsin, and insects seem to be macerated in the *Sarracenia purpurea* pitchers more quickly than by ordinary rain-water, yet it is believed that the plants profit mainly by the liquid manure obtained. Consult Darwin, 'Insectivorous Plants' (new ed., New York 1900).

SARRAIL, Maurice, French general: b. (?). In 1913 he commanded a division of the Sixth Army Corps at Rheims and at the opening of the war was sent to command at the Argonne. Together with Dubail he protected the French right flank against the most ferocious attacks from Thionville and Metz. He splendidly organized the defense of Verdun, holding it against the rush of the Germans in August and September 1914 with the Third Army. Much of the strategy in the retreat to the Marne was given to his execution. About the middle of the year 1915 he was withdrawn from command but was appointed commander-in-chief of the Army of the Orient in August to succeed Gouraud. He made Saloniki, Greece, his headquarters and with his forces, which were a mixture of troops of the most heterogeneous nature (British, French, Italian, Greek, East Indian, African, etc.), he captured Monastir in December 1915 but advanced no further. He was recalled December 1917.

SARSAPARILLA, an alterative drug obtained from the roots of a species of *Smilax,* indigenous to Central and South America. The drug-yielding species of this genus, to which the American cat-briers belong, are not very exactly identified, although sarsaparilla has been known to Europeans since 1536–45, and was extensively used soon afterward. *Smilax officinalis, S. medica* and *S. papyracea* are believed to be the principal sources of supply of sarsaparilla. They are tough, twining shrubs with square or round prickly stems, small flowers and generally shining leaves. Sarsaparilla plants were somewhat cultivated in Jamaica, but are chiefly obtained by trade with the aborigines of the countries where they grow. The drug itself is extracted from the horizontally creeping roots of the *Smilax,* which radiate from the stems, and are so long that it takes an Indian many hours to disentangle them from the soil and other roots. They are then dried and wrapped for transportation. The form of the original package in which the roots reach the pharmacist is an indication of the market from which it is sent, and the country from which it is exported furnishes the commercial name of the drug. Thus, Rio Negro, otherwise known as Para or Lisbon sarsaparilla, is always exported in cylindrical bundles, about three and one-half feet long and five or six inches in diameter, composed of finely wrinkled roots, brown with adhering earth, cut square and even at both ends, and wound closely with the stems of Pothos. Jamaica sarsaparilla (a name which formerly included many other varieties, now differentiated) is sent out loosely. Sarsaparillas are classed as mealy or non-mealy sarsaparillas, according to the amount of starch granules in the parenchyma, a condition which seems to depend upon locality, and they differ in the color of their barks and in microscopical characters.

Several plants are used as substitutes for true sarsaparilla. The aromatic roots of *Aralia nudicaulis* and *A. hispida* furnish respectively the wild and bristly sarsaparilla, in America (see ARALIA). Texas sarsaparilla comes from the roots of *Menispermum canadense.* Australia has its spurious sarsaparilla in the spindle-shaped root of *Hardenbergia.* Indian sarsaparilla is derived from *Hemidesmus indicus;* German sarsaparilla is the roots of various species of *Carex.* while the Italian drug of that name is the root of *Smilax aspera.*

SARSFIELD, Patrick, EARL OF LUCAN, Irish Jacobite: b. Ireland, about 1645; d. Netherlands, 19 August 1693. He became a colonel in the Irish army in 1686 and was a strong supporter of the cause of James II in Ireland, by whom he was created Earl of Lucan. He drove the English out of Sligo, fought at every important engagement of the war and had charge of the defense of Limerick. When that city capitulated in 1691, he crossed over to France where James gave him command of the Irish troops in the intended invasion of England the following year. After the battle of La Hogue, 19 May 1691, he tendered his services to France, fought at Steenkirk on 3 Aug. 1692, and was mortally wounded at Neerwinden in the battle of Landen, 19 August.

SARSI (sär'sē) **INDIANS.** Also Sarcee, Sarsee, Sussee, etc., from a Blackfoot word said to signify «not good.» Their own name is Sotemia. A tribe of the Montagnais division of the Athapascan stock of North American Indians who formerly subsisted mainly by hunting, fur-trading, but who now gain a livelihood by farming, stock-raising and haying and as laborers. They are under the Sarcee agency at Calgary, Canada.

SARTAIN, sär'tān', **Emily,** American artist: b. Philadelphia, 17 March 1841. She is the daughter of John Sartain (q.v.), under whom she studied and worked at engraving, afterward studying (1864–70) at the Pennsylvania Academy of Fine Arts, then in Italy, and still later (1871–75), under Luminais, in Paris. She excels in mezzotint engraving, in etching and in portrait-painting; has accomplished much in book-illustration and the etching of framing prints, and in genre work has also distinguished herself. She received a medal at the Centennial Exhibition in 1876, and the Mary Smith prize at the Pennsylvania Academy in 1881 and 1883. In 1875 and 1883 she exhibited oil paintings at the Paris Salon. From 1881 to 1883 she was an editor of *Our Continent,* and after 1886 principal of the Philadelphia School of Design for Women. In 1900 she went to Paris as official delegate from the United States government to the International Congress on Instruction in Drawing.

SARTAIN, John, English-American engraver and editor: b. London, 24 Oct. 1808; d. Philadelphia, 25 Oct. 1897. Before reaching his majority he did notable work, having studied line engraving under John Swain; and his illustrations for Ottley's books on early Italian prints (1826) gave promise of his future achievements. He came to the United States in 1830, settled in Philadelphia and introduced in this country mezzotint, which he had begun two years earlier to practise. Entering actively into his work here, he added to engraving miniature-painting on vellum and ivory and portrait-painting in oil. He was the designer of several public monuments, of which the best known is that to Washington and Lafayette in Philadelphia. He was also editor of the *Foreign Semi-monthly Magazine* and of the *Union Magazine,* which he renamed *Sartain's Union Magazine.* Among his more important engravings are 'Christ Rejected' (1862), after Benjamin West; 'The Ironworker and King Solomon' (1876), after Christian Schussele, and the 'Battle of Gettysburg,' after Rothermel. He engraved many other historical paintings and also portraits of famous Americans, after well-known artists. By his long and varied career of productive work, his services as chief administrator of fine arts at the Centennial Exhibition in 1876 and through the many positions which he held in connection with prominent societies and institutions, he accomplished results of great importance in the development of art, particularly the art of his adopted country. He wrote 'Reminiscences of a Very Old Man' (1899).

SARTAIN, William, American landscape, genre and portrait painter: b. Philadelphia, 21 Nov. 1843. He is the son of John Sartain, and after graduation from college engraved for three or four years, then studied under Schussele and at the Pennsylvania Academy of Fine Arts. He then went to Paris and studied seven years under Bonnât and at the École des Beaux Arts. He traveled in Spain, Italy and Algiers, and after exhibiting in London (1875) and New York Academy (1876) returned to America, settling in New York. He was one of the original founders of the Society of American Artists and was for some years professor of the life class of the Art Students' League, New York. His oil paintings include 'Italian Head' (1876); 'Narcissus' (1878); 'Near Algiers'; 'Young Musician'; 'Nubian Schiek'; 'Chapter from the Koran' (in Metropolitan Museum); 'In the Basilicate'; 'Portrait of his Mother,' and other portraits. He now has studios in New York and Paris. Represented in many museums in the United States and South America.

SARTO. See ANDREA DEL SARTO.

SARTO, Giuseppe. See PIUS X.

SARTOR RESARTUS. Among autobiographies, Sartor Resartus («the tailor patched») remains unique. It was built up out of Carlyle's thinking and his experience of life during his first happy married years at Craigenputtoch. It is a thickly veiled autobiography. Thomas Carlyle appears in a mask as Diogenes Teufelsdröckh, professor of things in general in the German university of Weissnichtwo. The second book deals with the advent, education, love affair and spiritual development of this remarkable professor. This is the most easily understood portion of the book and contains the most famous passages, such as the noble chapter, «Natural Supernaturalism.» The first and third books profess to give translated excerpts from this imaginary professor's imaginary treatise on clothes, with comments and explanations by the «English editor.» These

are Carlyle's radical opinions set forth, not in a complete system, but as fragments of a philosophy.

Most undeservedly 'Sartor' has the reputation of being in prose what 'Sordello' is in verse. The varied, impassioned, richly allusive style is supposed to be "German," and the matter to be beyond ordinary human comprehension. This widespread misconception is due to the fact that 'Sartor' appeared at a time when "German" was a synonym for "mysterious." Carlyle learnt his peculiar style in his father's house before he knew a word of German. There is difficulty in grasping Carlyle's unusual ideas, because they are unusual, not because they are presented feebly or obscurely. The narrative portions offer no difficulties. "It is a work of genius, dear," was Mrs. Carlyle's criticism; and the world has come to agree with this verdict.

The spiritual experience delineated in the second book is typical. Teufelsdröckh at the nameless university loses the simple creed of childhood and passes into doubt, denial, unbelief. He is in consequence utterly miserable. From this stage in his spiritual progress he passes, by way of the "Centre of Indifference" to "The Everlasting Yea," or positive working philosophy. The main ideas of renunciation, duty, work are derived from Goethe, whom Carlyle reverenced.

America welcomed 'Sartor' before the writer's own country. Thanks to Emerson, an American publisher had the honor of producing the *editio princeps*. America also led in appreciation. The philosophy of 'Sartor' had no little share in bringing on the Transcendental movement in New England. It exerted a great influence over Carlyle's contemporaries. Such leaders of thought as Emerson, Huxley, Tyndall, Ruskin and Kingsley confess their debt. An edition of 30,000 copies sold before Carlyle's death. The first critical edition of the text with full notes and introduction by Archibald MacMechan appeared in 1896.

ARCHIBALD MACMECHAN.

SARTORIUS, the tailor's muscle (from the Latin *sartor,* a patcher, tailor), a muscle of the thigh which is attached at one end to the edge of the anterior, superior, spinous process of the ilium or chief bone of the pelvis, and at the other to the superior, anterior and internal part of the tibia. It takes its name from the fact that it is by the contraction of the two sartorius muscles that the legs are crossed in sitting in the manner of tailors. See ANATOMY.

SARTS, a name given to the settled inhabitants, whether agriculturists or traders, as distinguished from the nomad inhabitants of Turkestan, Afghanistan, Persia and the adjacent regions of Asia. Strictly speaking the name has no ethnological significance.

SARUM, sā'rŭm. **Old,** England, an ancient deserted city of Wiltshire, two miles north of Salisbury, or New Sarum, to which the inhabitants of Old Sarum removed after 1219 owing to an insufficient water supply. Notwithstanding its desertion, the old site retained its electoral rights to return two members to Parliament, until its disenfranchisement by the Reform Bill of 1832. It has passed into English literature as a type of the "rotten boroughs," acquired by purchase; its most distinguished representative was William Pitt, whose first appearance in Parliament was as member for Old Sarum.

SASIN, an East Indian antelope, the blackbuck (*Antilope cervicapra*), blackish brown in color. See ANTELOPE.

SASKATCHEWAN, săs-kach'ĕ-wan, the central prairie province of Canada, named after the river (q.v.). Prior to 1905 it was a portion of the Northwest Territories, with an area of 107,092 square miles and with a small and scattered population. On 1 Sept. 1905 it was created a province with full rights of self-government and including the territory of Assiniboia with a portion of Athabasca. The area became 251,700 square miles of which 8,318 square miles was water surface — chiefly small lakes.

Physical Features and Climate.— The province is traversed by the North and South Saskatchewan rivers. In the farthest north is the Churchill River. The Qu'Appelle and the Souris rivers are in the centre and south. There are some large lakes, among which may be mentioned the Athabasca 2,842 square miles, the Reindeer 2,437 square miles, the Wollaston 996 square miles, the Quill lakes 163 square miles, the Last Mountain 98 square miles. The best evidence as to climate is the production of the province — its grain, vegetables and livestock compete with the best in the world. The atmosphere is clear and bright — a large proportion of sunshine, with a never-failing breeze to temper the heat of the summer days. The winters are cold but bright and dry. It is very similar in a general way to that of Alberta and Manitoba.

Progress of the Province.— The railway mileage increased from 900 in 1896 and 1,520 in 1905 to 6,148 at the end of 1919. While the long-distance telephone mileage was nil in 1900, it was 1,500 in the end of 1908 and 20,152 in 1919, with rural lines totaling 110,481 miles. The townships partially settled and under a form of local or municipal government were 882 in 1905 and 2,700 in 1919. The Loan Company investments which in 1906 totaled $12,000,000 were in 1910 $40,000,000. By the end of 1918 $1,845,178 had been spent on university buildings and $2,922,078 on Parliament buildings.

Resources.— The province is the centre of the grain-raising area of Canada, also stock-raising, fisheries and timber. The undeveloped coal resources in the southern portion of the province are of great extent. Mineral formations abound north of Township 52, but there has been no development to any great extent due to lack of railway transportation facilities. One mine, at present operating, packs ore 60 miles overland to rail-head and ships to a smelter in British Columbia. The government is conducting tests of lignite fields in the south with a view to its use for commercial purposes. In 1918 wheat acreage was 9,249,260 with a yield of over 92,492,600 bushels; oats, 4,988,499 acres, with a yield of 214,542,728 bushels; barley, 699,296 acres, with a yield of 4,894,572 bushels; flax, 840,957 acres, with a yield of 4,204,785. The value of the 1918 wheat crop at government price was $474,139,428.88. The province is becoming more of a livestock country annually. Formerly considerable

SASKATCHEWAN

SCALE.
Statute Miles, 55 = 1 Inch.
0 10 20 30 40 50 100

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Topley, Photo

1 Threshing from the Stook, near Moose Jaw, Saskatchewan

2 Sheep-ranching, near Cypress, Saskatchewan

ranching was carried on in the western part of the province, but this is now giving place to mixed farming, grain and stock-raising combined. In 1918 there were in the province horses, 1,000,076; milch cows, 352,989; other cattle, 926,342; sheep, 134,177; hogs, 521,240. Considerable of the packing of meat is now done in the province, but most of the stock is shipped east and south. The timber cut in 1918 was valued at $2,036,029.

Settlement and Population.— Immigration poured into the province after its separate organization. To-day the whole of the eastern half of South Saskatchewan is practically homesteaded, while Central Saskatchewan, from Manitoba to the South Saskatchewan River, is thickly dotted with homesteads — excepting the heavily timbered district in the northeast. Large settlements have also been made west and south of Saskatoon, as well as south of Battleford and farther north, in the Prince Albert district. In all these districts as well as in the southwest triangle of the province — some 23,000,000 acres — which include the lands south of the main line of the Canadian Pacific Railway, from Moose Jaw west, as well as all the lands which remain unoccupied north of Swift Current and Maple Creek, there are still thousands of homesteads avaliable. In all, there are in the province 86,826,240 acres available for settlement. Homesteading invariably proceeds from railway lines and the building of the Grand Trunk Pacific and rapid extension of other lines of railway during the past few years have been a great factor in bringing settlement to Saskatchewan. In population the province has increased from 91,000 in 1901 to 744,000 in 1919. Villages are springing up almost daily and the growth of a settlement of one family into a town of 1,000 persons within a year is quite common. Some of the more notable places are Yorkton, Weyburn, Battleford, Estevan, Swift Current, Melville, Indian Head, Rosthern, Moosomin, Wolseley, Maple Creek, Qu'Appelle, Humboldt, Strasborg, Arcola, Watrous, Lumsden, Lloydminster, Melfort and Wilkie. The larger centres are Regina (40,000), Moose Jaw (16,809), Saskatoon (21,054), Prince Albert (10,000).

History, Education, etc.— The policy of the government has been one of local development. Elaborate Parliament buildings have been constructed at Regina, the University of Saskatchewan built and organized at Saskatoon, hundreds of bridges constructed throughout the province, the telephone system acquired and managed, grain elevators worked in co-operation with the farmers, the railway-operated mileage increased from 2,025 in 1907 to 6,148 in 1919. Arrangements were made with the Canadian Northern and the Grand Trunk Pacific in 1909 for the construction of branch lines under a total government guarantee of $11,999,000. As to education the enrolled pupils increased from 31,275 in 1905 to 135,358 in 1919; the school districts from 1,190 to 4,204.

Government.— The provincial government is vested in a lieutenant-governor and a legislative assembly of 62 members, elected for five years. Women were given the franchise in 1916. The revenue in 1916 was $5,631,910 and the expenditures $5,529,610.

Consult reports of various government departments; *The Public Service Monthy* (Regina); 'Bulletin IX' (Fifth Census of Canada); Black, 'History of Saskatchewan' (Regina 1913); Boam, H. J., and Brown, A. G., 'The Prairie Provinces of Canada' (London 1914); Gilbert, Louis. 'Le Saskatchewan' (Paris 1914); Short, Adam, and Doughty, 'Canada and its Provinces' (22 vols., Toronto 1913).

SASKATCHEWAN, a river in Canada, which has its sources in the Rocky Mountains near long. 115° W. It is formed by the junction of two main branches, called respectively the North and South Saskatchewan, which flow generally east to their junction, about 25 miles east of Prince Albert. Thence the river takes a curve northeast and southeast, receives the Carrot River from the south, and passing through Cedar Lake empties into Lake Winnipeg, after a course of about 1,300 miles measuring along the south branch, some 70 miles less than along the north branch. It flows through a region yielding coal, salt, iron, gold, etc., and now attracting numerous settlers. From the south branch of this great river northwest to Peace River the climate is adapted to the growth of wheat, and the valley of the river is said to be fitted to sustain as dense an agricultural population as any area of equal extent in the world. The main stream and its branches afford about 1,000 miles of navigable waterway, and steamers now ply on it.

SASSABY, or BASTARD HARTBEEST. See HARTBEEST.

SASSACUS, Pequot Indian chief: b. near Groton, Conn., about 1560; d. Mohawk Settlement, N. Y., June 1637. He was a powerful chief, a great warrior, and was believed by his own and other tribes to possess supernatural powers. The Pequot tribe occupied a large tract of land in southeastern Connecticut and consisted of about 700 warriors who were the terror of the settlers along the New England coast. In 1637 he attacked the English fort at Saybrook, Conn., massacred its inhabitants and then attacked Wethersfield, where he murdered several women and made captives of others. The colonists mustered their forces under the leadership of John Mason (q.v.) and destroyed the Pequot settlement, 5 June 1637. Sassacus took refuge with the Mohawks, who soon afterward murdered him.

SASSAFRAS, a tree of the laurel family (*Sassafras sassafras*), characterized by fragrant bark and roots, common in the eastern United States. Since it is readily propagated by seeds or by suckers which spring up from interminable slender root-stocks, and is apparently not liked by cattle, it is one of the first trees to reforest pastures and fields that have the light, moist soil that it affects. It is a veritable pest to one trying to clear land, as the smallest piece of rootstock left in the soil seems to send up a vigorous sprout. Its long roots, however, make it a difficult tree to transplant, unless young. Near the lower Mississippi, the sassafras attains its greatest height (about 100 feet), and is stout, with horizontal rugged branches, so that the foliage has a stratified appearance and a flattish top; it decreases in size as its northern limit is reached until it becomes only a tall shrub. The bark on old

trees is very thick and gray, with longitudinal scaly ridges; on the young twigs it is pale green and easily slips off. The shining, bright-green leaves will range in shape, on one spray, from an oval to a three-lobed outline, the "mitten shape," with one lobe at the side of the leaf, being characteristic. The flowers appear before the leaves in late winter if sheltered, and are generally unisexual, male and female blooms being found on different trees. They dangle in tassel-like racemes and are honey-colored and honey-scented, and thus attractive to bees. The staminate flowers are apetalous, with a six-lobed calyx, orange-stalked glands and nine stamens; the pistillate flowers have a similar perianth, a pale green ovary and style, and orange rudiments of stamens. The fruits are very brilliant, dark-blue, oblong, thin-fleshed berries, surrounded at their bases as the cup encloses the acorn, with a bright scarlet calyx-tube, borne on a thickened and elongated stalk. Unfortunately they are so soon taken by the birds that they are seldom seen, but the leaves assume distinct tints in autumn, which deepen from soft tones of yellow to dark red.

Sassafras is a member of the laurel family, to which camphor also belongs, and the whole plant, from the roots with the scaly, orange-colored bark to the leaves, is aromatic. Thoreau says of it: "The green leaves bruised, have the fragrance of lemons and a thousand spices." There is a legend that sassafras odor was wafted to the nostrils of Columbus on his first voyage, and convinced him that land was near.

The roots of sassafras very early in American history became an important article of medicine, worth three shillings a pound, and they were one of the objects for which an English expedition landed in Massachusetts in 1602. It was also called "ague tree," as a decoction of its bark was supposed to cure that disease. In American household practice, sassafras tea, an infusion of the young shoots and roots, has long been a favorite remedy for colds and a tonic, being a sudorific and stimulant. It is also an ingredient of root-beer. The bark of twigs and the pith are rich in mucilage (as are the leaves), and make a lubricant for oculists, and a yellow powder to thicken Creole gumbos, much as akra is used. The oil of sassafras is used for a perfume for soaps, etc. The wood itself is orange-colored with pale sap-wood, and when stripped of its bark resists decay for some time, while in contact with soil, so that it can be made into fence posts, although too brittle and coarse-grained for most purposes.

Australian sassafras is the name given to several large evergreen trees with aromatic barks, growing in Australia and Tasmania, namely: *Atherosperma moschata, Doryphora sassafras* and *Daphnandia micrantha.* Brazilian sassafras, or sassafras nut, is the pichurim bean. Swamp sassafras is the *Magnolia glauca.*

HELEN INGERSOLL.

SASSANIDÆ, săs-ăn'ĭ-dē, a dynasty of Persian kings which succeeded that of Arassidæ in 226 A.D. The founder of the line was Ardeshir, known to the Greeks as Artaxerxes; he was the grandson of Sassan, from which fact the dynasty is named. The Persian Empire was much extended under this dynasty as the outcome of successful wars against the Roman and Byzantine emperors. The Zoroastrian religion was brought back and maintained. The dynasty lasted until the death of Yezdegerd III in 1652. This king had been beaten by the caliph Omar in the battle of Nehavend, 10 years before, his territory having fallen into the hands of the Mohammedans. See PERSIA.

SASSARI, säs'sä-rē (also called *Sarsina*), Italy, in Sardinia. (1) capital of the province of its own name, 12 miles southeast of its port, Porte Torres. It is situated on a height 650 feet above the sea, amid orange and olive groves. It is well built and has several handsome palaces, churches, monasteries, nunneries, colleges, universities, an old citadel, a library, hospital, etc. Tobacco is the staple manufacture; trade is carried on in grain, fruits, oil cheese and goat-skins. Commercial population about 43,118. (2) The province occupying the north part of the island, having an area of 4,122 square miles; pop. about 310,000.

SASSOFERATO, Giovanni Battista Salvi, jō-vän'nē bät-tēs'tä säl'vē säs-sō-fā-rä'tō, Italian painter: b. Sassoferato, Ancona, Italy, 11 July 1605; d. Rome, 18 April 1685. He learned the elements of his art from his father, and afterward went to Rome and Naples and studied under Raphael, Domenichino, Guido and Albani. His paintings, whose subject is chiefly the 'Madonna and Child,' are filled with deep and true feeling and the coloring especially is elaborated with exquisite care, the principal scheme of his pictures including warm, luminous flesh tints, bright blue scarfs and crimson robes, harmonized with inimitable skill. He has also executed some good portraits and landscapes; his pictures are still highly esteemed and in 1858 his 'Marriage of Saint Catharine' was sold for £1,076 sterling, about $5,880.

SASSOLITE, native boric acid, $B(OH)_3$, occurs in the lagoons of Tuscany and in other natural waters, from which it is derived on a large scale by evaporation. It is also found in small, pearly, white scales, and as an incrustation.

SASSULITCH, săs-sool'ĭch **(SASSOULITCH, ZASSULITCH), Vera**, Russian Nihilist: b. Russia, 1853; d. Moscow, 18 July 1921. She was accused of complicity in a Nihilist plot in 1869 and unjustly imprisoned for many years. In 1878, indignant at the treatment inflicted on a prisoner by the Saint Petersburg chief of police, Trepoff, she armed herself with a revolver and on 5 February attempted his assassination. She was tried and acquitted in April 1878. The trial was afterward declared null and void, but she disappeared and until 1905 lived in retirement in Switzerland. Her writings were collected in two volumes and published in 1906.

SASTEAN (săs'tē-an) **INDIANS.** See SHASTA INDIANS.

SÁTÁRA, sä-tä'rä, or **SATTARA**, India, in Bombay, (1) capital of the district of the same name, 56 miles southeast of Poona, crowns a small, steep and rocky hill, just below a strong hill fort. It consists of one long street of uniform appearance, excepting the rajah's palace, which is of modern construction. The town was formerly the chief seat of the Mahrattas. Pop. 29,601. (2) The district, covering an area of 4,825 square miles.

Much of the territory is irrigated, and the chief crops are millet, pulse, oil-seeds and sugar-cane. The manufactures are cotton-cloth, blankets and brassware. Modern improvements are the Kistna Canal and irrigation works. The Southern Mahratta Railway traverses the district from north to south. Pop. about 1,200,000.

SATELITE, the trade name for a fibrous serpentine having a chatoyant effect; mined as a gem in Tulare County, Cal.

SATELLITES, *in astronomy*, secondary planets or moons. One satellite has been observed with Neptune; four with Uranus; Saturn has 10, Jupiter eight, Mars two and the earth one. The rings of Saturn are technically said to be composed of a great number of satellites, but these are probably exceedingly small, and are possibly not larger than particles of sand or dust.

SATIN, in textile manufacture, a closely-woven silk, in which the weft is hidden, presenting a glossy surface. In the manufacture of other silken stuffs each half of the warp is raised alternately; but in weaving satin the workman only raises the 5th, 8th or 10th part of the warp; thus the weft is hidden beneath the warp, which, presenting an even, close and smooth surface, is the more capable of reflecting the rays of light. In this way satin acquires that lustre and brilliancy which distinguish it from most other kinds of silks. Sometimes satin is made with a pile and flowered pattern and it is then termed satin-damask. A cotton imitation is called satin-sheeting. The chief seats of this branch of manufacture are Lyons in France, and Genoa and Florence in Italy. From the East Indies are imported those light stuffs called Indian or Chinese satins. They are either plain, damasked striped, open-worked or embroidered. See SILK AND SILK INDUSTRY.

SATIN-BIRD, a kind of Australian bower-bird (*Ptilonorhynchus violaceus*). The adult male is conspicuous for the satin texture of its glossy black plumage. The younger bird is at first entirely of a dull green color, which gradually becomes mottled with black, and eventually changes entirely into that hue. Long before the construction of the nest, and quite independently of it, they, with consummate skill, weave an arbor-like gallery of uncertain length (see BOWER-BIRDS), in which they amuse themselves with the most active glee, the male displaying himself therein to attract the hen bird. The architecture of the bower is very tasteful, and scarcely a day passes without some fresh arrangement of the shells, feathers, bones and other decorative materials, which they bring from long distances in the bush to ornament the bower and the platform on which it stands.

SATIN-FLOWER, or **SATIN-POD**, a cruciferous plant of the genus *Lunaria*, native to Europe and Asia. One of the two species (*L. rediviva*) is perennial, the other (*L. annua*) is annual or biennial, and is called "honesty." Both are pubescent, branching herbs, with mostly cordate leaves, and are cultivated not only for their four-merous, large violet flowers in terminal racemes, but for the long-stalked pods, which are more than an inch long, very flat and two-celled. The veined valves covering the seeds, which are long stemmed, soon fall off with the seeds and leave only the partition wall between the cells. This is elliptic in shape, of parchment-like texture and shining with a silvery gleam that makes the groups interesting for decoration, and they are much sold on Paris flower-stands for this purpose.

SATIN SPAR, a fine, fibrous variety of either gypsum or calcite. These may be distinguished from each other by the effervescence of the calcite satin spar with acids and also by its superior hardness. The color is usually snowy white, sometimes flesh or salmon red. Owing to the fibrous structure, the mineral shows a beautiful satiny or pearly opalescence. It is rather extensively manufactured into cheap jewelry and ornaments. The best material for this purpose comes from England and is sold at many tourist resorts, notably Niagara Falls, near which place small quantities of inferior material occur native.

SATIN-WOOD, the product, principally of the *Chloroxylon swietenia*, of India and Ceylon. This is a small tree with large panicles of whitish flowers and deciduous, long, pinnate leaves, and can furnish a log three to six inches square. The wood is very hard, close-grained and durable and light orange in color; it takes a fine polish and when of the feathered variety is very beautiful, but liable to split. In the 18th century this ornamental wood was much in demand for handsome furniture, with scroll work, and with medallions painted upon it. It is now principally used for cabinet-work, for picture-frames, the backs of brushes and marquetry. Several other species of trees in the East and West Indies, especially the *Maba buxifolia* and *Xanthoxylum caribæum*, produce woods of similar appearance, quality and name.

SATINET, an inferior fabric, woven much thinner than ordinary satin. The name is also given to a kind of cloth woven, with cotton warp and woolen weft, to imitate satin.

SATIRE, a kind of literary composition in verse or prose, in which wickedness or folly is censured and held up to reprobation; it is a word of Latin origin and the ancient Roman poets were the inventors of the satire. From the time of Lucilius (d. 103 B.C.) till now, says Dryden, "the very name of satire is formidable to those persons who would appear to the world what they are not in themselves." Of the four princes of Roman satire — Lucilius, Horace, Persius, Juvenal — Persius (d. prematurely in the reign of Nero) is the least important. Juvenal (who appears to have produced satires in the reign of Domitian and who survived into the time of Hadrian, 117 A.D.) uses satire with consummate power and spirit, as an engine for attacking the brutalities of tyranny and the crimes, the follies and the frenzies of a degenerate society: he is confessedly the foremost satirist not only of ancient but of all times: great modern poets of all countries have translated or imitated the 16 satires of Juvenal; and he has been better translated into English than almost any other ancient poet. Horace (Augustan period) developed satire into a branch of composition peculiarly his own, and in this branch he is without a rival: he ridicules the follies of the world from the point of view of a man of the world; and though his morality does not rise above the level of a prudential moderation,

he enforces it with so much dramatic liveliness and gay humor that he has ever been the favorite poet of men of letters and epigrammatists. A totally different form of satire is the mediæval 'Reynard the Fox,' the 'Owlglass' (*Eulenspiegel*), 'Piers Plowman'; followed in the Reformation epoch by Ulrich von Hutten's 'Epistolæ Obscurorum Virorum,' Erasmus' 'Praise of Folly,' Rabelais, 'Gargantua,' Buchanan's 'Franciscanus,' etc. In Spain, where no freedom of criticism existed, the spirit of satire took refuge in the picaresque novel, prototype of Lesage's 'Gil Blas'; Cervantes' 'Don Quixote' too might be classed as a satire were it not so much more. Most of the great dramatists of the 17th century were more or less satirists: among them Molière stands pre-eminent. Butler's 'Hudibras' is a model of unadulterated satire; and political satire is carried to perfection in Dryden's 'Absalom and Achitophel.' In France, Boileau was regarded as the modern Horace in satire and in the mock-heroic, but in both respects he was equaled or even surpassed by Pope. In Germany the most conspicuous satirists have been Hagedorn, Kästner, Wieland, Tieck, Goethe; in England in the 19th century the foremost were Byron, Hood, Hook, Jerrold, Thackeray, Carlyle; in the United States James Russell Lowell, through his 'Biglow Papers,' held rank among the foremost in political satire.

SATIRE MÉNIPPÉE (so called because it mingles prose and verse after the manner of the Menippean satires of Varro), the title of a political satire directed against the Ligue and the Spanish party and their efforts to keep Henry of Navarre from the throne of France. It parodies in telling fashion the proceedings of the States-General which had just voted (February 1593) to set aside the Salic law in order that claim to the crown might be made through the female line. It consists of two parts. The first is a sort of prologue. Two hawkers are introduced who cry most vociferously, in the approved style of the patent-medicine vendor, the wonderful virtues of the famous "catholicon d'Espagne," or Spanish panacea. Then the assembling of the States-General is described, and the hall where their sittings are to be held, with its many tapestries, each of which contains in the scene which it represents some sharp satiric thrust at the Ligue. The second and longer part gives the deliberations of the body and reports the speeches. Various chiefs of the Ligue, in burlesque harangues, in which buffoonery and coarseness abound, betray the personal ambitions, the hope of extortion and dishonest gain, the disregard of national honor, that animate them. In sharp contrast with them is the speech of the spokesman of the third estate. Claude d'Aubray, who with sober eloquence and an accent of sincere patriotism pictures the sad state of France, torn by civil strife, lays the blame at the door of the Ligue, and points the way to national unity, order and well-being in the choice of Henry IV. The 'Satire Ménippée' appeared at the beginning of 1594, though it was circulated in manuscript some months before, not, however, till the Parliament of Paris (June 1593) had declared the decision of the States-General void and upheld the Salic law. So it came too late to play a decisive part in the struggle, but it helped strengthen the cause already won. Its good sense, sharp wit and strong national feeling delighted a very large public, and it speedily became famous. D'Aubigné expressed the general estimate when he called it "the most excellent satire of our time." But it has little of universal and permanent appeal, and the reader of to-day is not only not interested in the subject matter, but is often offended by its extreme coarseness.

The satire was the work of six men: Pierre Le Roy, a priest; Jacques Gillot, Nicolas Rapin and Pierre Pithou, men of the law; and Jean Passerat and Florent Chrestien, poets and scholars. It appeared anonymously, and the share of each contributor is not certain. But tradition generally ascribes to Le Roy the general conception and plan of the work and the composition of the first part, and to Pithou the longest and most serious piece, the speech of d'Aubray.

ARTHUR G. CANFIELD.

SATISFACTION, *in law*, the satisfying of an obligation or claim, as by performance, payment or giving an equivalent; indemnity for an injury. The doctrine of satisfaction is of importance in the interpretation of wills and also in the law of contracts. For example, if a debtor by will bequeaths to his creditor a legacy at least as great as an existing debt, such legacy is held to be a satisfaction of the debt in the absence of any circumstance rebutting this presumption. Likewise it has been held that where a person has agreed to manufacture, to the satisfaction of the buyer, an article, as an engine, in which personal taste is not directly involved, but merely mechanical utility, the buyer is bound by the contract if he has no reasonable grounds for refusing the article after its completion.

SATOLLI, sä-tōl'lē, **Francesco**, Italian ecclesiastic: b. Merciano, Perugia, 21 July 1841; d. Rome, 8 Jan. 1910. He became professor of dogmatic theology at Urban College of the Propaganda, Rome, and in 1888 was made archbishop of Lepanto. He was the papal representative at the celebration of the centenary of the establishment of the see of Baltimore in 1889, and returned to the United States in October 1892 in the capacity of appellant judge with extraordinary discretion. His action in regard to several notable Church controversies raised up a party of opposition against some of his proposed measures in ecclesiastical affairs in America. In January of the next year an order came from Rome quelling the opposition and creating Monsignor Satolli permanent American apostolic delegate. He returned to Rome in 1896 and was elevated to the cardinalate. During the Saint Louis Exposition in 1904, he again visited the United States.

SATRAPS, sāt'răps or sā'trăps, the name given the governors of provinces in the ancient Persian empire. The power of the satrap, so long as he retained the favor of his sovereign, was absolute; he levied taxes at his pleasure and aped the capricious tyranny of his master unchecked. When the monarchy of Cyrus began to decline many of the satraps threw off their allegiance, and founded independent kingdoms of their own. The term satrap is sometimes used to signify a petty despot.

SATSUMA, sät-soo'mä, Japan, province in the southwestern part of the island of Kiushu, now a part of the prefecture of Kagoshima. It has played an important part in the history of Japan, and before the revolution of 1868 it was one of the most powerful feudal strongholds. Its samurai ably supported the revolution which placed the Mikado in power, and readily yielded their prerogatives in order to secure a stronger nation. However, they rose in rebellion under Saigo (q.v.), in protest against the predilection of the court for instituting foreign customs in 1877; but the rebellion was put down. The province manufactures a beautiful porcelain, known as Satsuma ware.

SATSUMA WARE, a fine kind of pottery or semi-porcelain made in Japan, having a feldspathic glaze of a light straw color, the surface of which is covered with a network of fine cracks. Red and green colors and dulled gold are employed for decorating the ware. Fine old Satsuma ware is highly esteemed by collectors. See ART; JAPAN; PORCELAIN; POTTERY.

SATURATION, *in meteorology*. A space is said to be "saturated" with aqueous vapor when its condition is such that the temperature cannot be reduced by the smallest amount without the production of condensation. In meteorology we have to deal mainly with spaces that are filled with ordinary atmospheric air. Hence the phenomena which relate to atmospheric saturation are of the greatest practical importance. The quality of moisture that is required to saturate a given mass of air is independent of the pressure of the air, but it depends largely upon the temperature of the air. A given mass of heated air can contain a much greater quantity of moisture than the same mass can retain when cold; and the quantity of moisture that any mass of air can retain without condensation is sensibly equal to the quantity of moisture that would be required to saturate the space occupied by the air, if the air itself were absent. When a given space contains a given quantity of aqueous vapor, the temperature at which the space is precisely saturated is called the "dew-point," corresponding to the quantity of vapor that is present. If water is introduced into a closed vessel from which the air has been exhausted, a portion of it will evaporate, and the evaporation will proceed until the pressure in the vessel, due to the presence of the aqueous vapor, attains a certain definite value, which depends solely upon the temperature of the vessel and its contents. The limiting pressure (or, as it is called, the "tension of the saturated vapor") so attained at various ordinary temperatures, is given in the table following.

The condition of the air with respect to saturation is called its "hygrometric state"; and the hygrometric state is defined, so far as its numerical estimation is concerned, as the fraction that is obtained by dividing the tension (or pressure) of the vapor that is actually present, by the tension of the vapor that would be required to completely saturate the same bulk of air, at the observed temperature. The tension of the vapor that is actually present in the air under given conditions may be determined by means of the "hygrometer," an instrument which is made in a great variety of forms. In Regnault's form (which is very accurate, although not well adapted to general use), a polished silver tube is placed in a vertical position, and partially filled with ether, into which a delicate thermometer dips. A current of air is then drawn up through the ether by means of an aspirator, and as the ether is gradually chilled by the consequent evaporation, there comes a time when moisture begins to condense from the air upon the polished exterior of the silver tube. The temperature of the ether is then noted by the thermometer that dips into it; and we take this temperature as the "dew-point" of the air that is in contact with the outer surface of the silver tube. By reference to the table given above, we are then able to determine, at once, the tension of the vapor that is actually present in the air; and upon dividing this by the tension of saturated vapor corresponding to the actual temperature of the air, we obtain the fraction which expresses the "hygrometric state" of the air. Suppose, for example, that the temperature of the air is 70° F., so that if it were saturated with moisture the tension of the vapor that it contains would be equal to the pressure produced by 0.739 inch of mercury. Let us further suppose that the hygrometer shows that dew is deposited upon the silver tube when the temperature falls to 50° F. We should then know that the quantity of vapor actually present in the air is sufficient to produce saturation at a temperature of 50° F.; and by reference to the table we see that this signifies that the actual tension of the vapor present in the air is the same as the pressure due to 0.362 inch of mercury. The "hygrometric state" of the air is then found by dividing 0.362 by 0.739. That is, it is 0.492.

Temp. Fahr.	Tension of vapor at saturation in inches of mercury	Temp. Fahr.	Tension of vapor at saturation in inches of mercury
0°	0.044	60°	0.522
5°	0.054	65°	0.622
10°	0.068	70°	0.739
15°	0.086	75°	0.873
20°	0.108	80°	1.029
25°	0.135	85°	1.209
30°	0.167	90°	1.417
35°	0.203	95°	1.655
40°	0.248	100°	1.926
45°	0.300	105°	2.236
50°	0.362	110°	2.589
55°	0.436	115°	2.987

A. D. RISTEEN, PH.D.

SATURDAY, so called from the planet Saturn, the seventh day of the week; the *Sabbath* of the Jews. It is called by the Italians *Sabbato;* by the French, *Samedi* and by the Germans, *Sonnabend* (Sunday eve), or in High German, *Samstag*, a corruption of *Sabbathstag* (Sabbath day); and in Lower Germany, *Saterdag*, of the same origin as the English.

SATURN, an ancient Italian divinity, husband of Ops and father of Picus. He was the god of seed-time and harvest and is represented as bearing a sickle. He was later identified with the Greek Chronos, who, driven from his

supreme throne by Zeus, came to Latium and set up his kingdom there. Under his reign was the Golden Age. At Rome his throne was shared by Ops, afterward identified with Rhea, and in the time of the last Tarquin a temple was built to him at the foot of the Capitol and was afterward used as the treasury (Saturni Ærarium). The foundations of this temple and eight pillars still remain. The statue of Saturn was all year long swathed in woolen bandages excepting during his festival, the Saturnalia (q.v.), when it was uncovered to the eyes of the people.

SATURN, the sixth major planet in the order of distance from the sun. Although this planet is not quite so large as Jupiter, its grand array of rings and satellites renders it the most stupendous object in the solar system. To the naked eye, when near opposition, it shines as a bright star of the first magnitude. Its light is somewhat yellow, bearing a great resemblance to that of Arcturus, both in color and brightness. Saturn, like the other superior planets, is best seen in opposition, when it rises at sunset, and is visible almost the entire night. An opposition occurred about 12 Aug. 1904, and the times to look for it in future years may be found by the rule that it occurs about 13 days later every year than it did the year before. Its time of revolution is 29.6 years, at the end of which period it will return to opposition at the same time as at the beginning, and will present the same general aspect.

The rings of Saturn render it a beautiful and striking telescopic object. They are about 173,000 miles in external diameter, and the central opening of the ring is about 111,000 miles. This makes the breadth of the ring itself, from its inner to its outer circumference, about 31,000 miles, or more than four times the diameter of the earth.

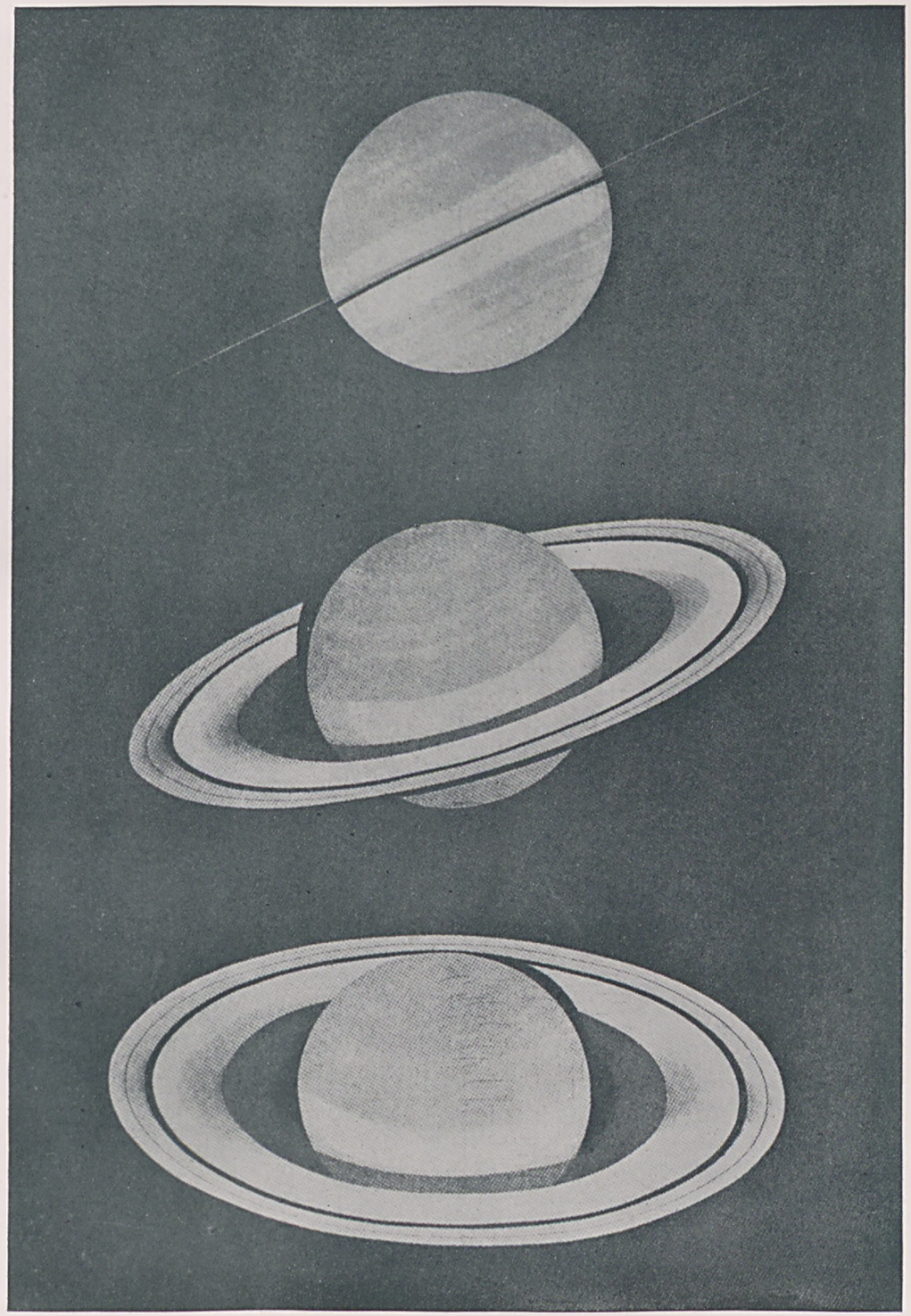
This object was an enigma to the early observers with the telescope. Galileo correctly described it as seeming handles of the planet, a circumstance which, up to the present time, has led to their visible ends being called *ansæ*. As Saturn moved forward in its orbit these handles disappeared from view, owing to the rings being seen edgewise, a circumstance which greatly perplexed Galileo, and encouraged those of his opponents who were disposed to throw doubt on the accuracy of his observations. But the correctness of the latter was shown in a very few years by the reappearance of these seeming handles. The mystery was at last solved by Huyghens in 1656, who, after long and careful study, announced that "the planet is surrounded by a thin, plain ring, nowhere touching it, and inclined to the ecliptic."

When the rings of Saturn are carefully examined with a powerful telescope they are found to be quite complex in their make-up. Shortly after Huyghens made known the real form of the rings, Cassini, of the Paris Observatory, announced that there were really two rings separated by a fine dark line. The outer one was much narrower than the inner one. The line of separation is called the Cassini division. About 1843 Encke of Berlin announced that the outer ring was sometimes seen as if divided. Careful study of the appearance makes it probable that there is no real division here, but only a somewhat soft, dark marking round the ring. Shortly afterward it was announced by Bond and others that there was really a third ring between the two hitherto known and the planet, which had escaped observation because it was very faint and dusky, looking somewhat like a band of crape. This dusky ring was for many years an object of much curiosity on the part of observers; but it is now found not to be a separate ring at all, but only a dark-shaded extension of the inner ring. It is now so easily seen in a good telescope that the failure of the earlier observers to see it suggests a possible change in the object. A suspicion that the inner ring at least was becoming broader and its inner edge approaching the planet, was propounded by Struve, who based his conclusions upon a comparison of drawings and measurements made from the time of Huyghens to that of Herschel. But this change is not considered as established.

The equator of Saturn and also its rings are inclined to the plane of its orbit around the sun by about 27°. As the planet moves round the sun, its axis, and hence its equator and rings, preserve the same direction in space, on the same principle that the axis of the earth keeps its direction in going round the sun. Consequently there are equinoxes and solstices for Saturn as for the earth. At the time of the Saturnian equinoxes the plane of the rings passes through the sun. There being two such equinoxes, at opposite points of the orbit, the interval between them will be half the time of revolution of Saturn, or 14.8 years. As the earth is quite near the sun compared with the distance of Saturn, the rings will be seen edgewise from the earth about the time of these equinoxes. They are then found to be so thin as to almost disappear in the most powerful telescope. The last occasion on which this occurred was in 1907; other opportunities will be offered in 1922 and 1937. At intervals intermediate between these times the rings are seen under the greatest angle, which, however, is never greater than 27° , which is their inclination to the orbit of the planet. At these times it is at its brightest, because the rings are opened out the widest to our view.

Another perplexing question was, how these objects could be kept in place— accompanying the planet in its orbit, and always centred on it, without meeting destruction by falling upon it. A very little mathematical calculation suffices to show that two bodies of this shape ought, on the least disturbance, to be gradually attracted toward the planet on one side or the other, falling upon it as surely as a chair, balanced on one of its legs, will fall to the floor. Laplace suggested that this might be avoided by the rings being liquid and not solid. But it was found by subsequent investigation that a liquid ring would fare no better than a solid one. Professor Benjamin Peirce suggested that the rings might be kept in place by the attraction of the satellites. But this suggestion proved no better than the others.

The mystery was at last solved by Prof. Clerke Maxwell of England, in a paper on "The Rings of Saturn," which gained the Adams prize essay from the Cambridge University. He demonstrated, by mathematical analysis, that the only objects which could permanently accompany the planet in the way



The Planet Saturn, as drawn by Proctor, but modified to take account of the extension of the Dusky Ring observed at Washington, 1901

the rings did would be a cloud of small satellites, possibly particles no larger than pebbles. A suggestion of this fact had been made more than a century before by Cassini, but little notice had been taken of it. This announcement made it of great interest to discover whether any other proof could be found for such a view. One consequence of Maxwell's theory is that the rings cannot all revolve together like a solid body, but that the inner portions must revolve more rapidly than the outer ones, the rate of revolution, in every part of the ring, being that appropriate to a satellite in that position. As the particles forming the rings were separately invisible, there was no way of deciding by telescopic observations whether they followed this law of revolution.

It was reserved for Keeler, at the Allegheny Observatory, by the use of the spectroscope, to demonstrate Maxwell's theory by observation. Bringing Saturn and its rings in such a position that they should fall across the slit of his spectroscope, only a single line of light penetrating the slit, it was found that, after being refracted by the prism, the dark lines of the spectrum were not straight, but were broken exactly in a way to indicate that the inner portions of the ring revolved more rapidly than the outer ones.

Saturn is surrounded by a retinue of 10 satellites, more than surround any other planet, their distances having a wide range, as will be seen by the table below:

NAME	Dist. from Saturn in radii of planet	Periodic time	Discoverer and date
Mimas	3.1	0 d. 23 h.	W. Herschel in 1789
Enceladus	4.0	1 d. 9 h.	W. Herschel in 1789
Tethys	5.0	1 d. 21 h.	Cassini in 1684
Dione	6.3	2 d. 18 h.	Cassini in 1684
Rhea	8.9	4 d. 12 h.	Cassini in 1672
Titan	20.5	15 d. 23 h.	Huyghens in 1655
Themis	24.8	20 d. 20 h.	W. H. Pickering in 1905
Hyperion	25.1	21 d. 7 h.	Bond in 1848
Japetus	59.6	79 d. 8 h.	Cassini in 1671
Phœbe	213.5	546 d. 12 h.	W. H. Pickering in 1901

Phœbe and Themis were discovered at the Harvard Observatory, by photographs of stars surrounding Saturn. The motion of the former is retrograde, while that of the remaining nine satellites is direct.

The largest and brightest of these objects is Titan, which may be seen in a telescope of moderate size. The faintest (except Themis and Phœbe), is Hyperion, which requires a large telescope to show it. Mimas also is a difficult object to see; but a telescope of three or four inches' aperture will commonly show several besides Titan. The Astronomical Ephemeris gives the apparent orbits and data for each year by which the visible satellites can be readily identified. One difficulty in doing this arises from the small stars which are frequently seen in the neighborhood of the planet.

Japetus, the outer satellite, has the singular peculiarity of being much brighter at the western than at the eastern elongation. The variation of brightness goes on with such regularity that it can be attributed only to one cause—the satellite is darker in color on one side than on the other, and revolves on its axis in the same time that it goes round the planet, thus always presenting the same face to the latter, as the moon does to the earth. A peculiarity of Japetus, Themis and Phœbe is that the plane of their orbits deviate from the planes of all the other orbits. One of the curious features of the Saturnian system is that the rings of the orbits of the six inner satellites all lie in the plane of the planet's equator. It is known that the planes are thus kept together by the mutual action of all these bodies, combined with the attraction of the equatorial protuberance of Saturn itself.

It will be seen from the distances given in the above table that the satellites are divisible into several groups. The five nearest the planet follow each other at fairly regular and not wide intervals. But the sixth, Titan, is more than twice as far as the one next within it. Themis and Hyperion are only a little outside of Titan, and move in very eccentric orbits. There is a curious action between these bodies, in consequence of which three revolutions of Hyperion are almost exactly equal to four of Titan; and the motions of the two satellites are so timed that they come into conjunction only at the point where Hyperion is farthest from the planet. These conjunctions occur at intervals of 65 days, during which Titan will have made four revolutions and Hyperion three.

This and other relations which exist between the motions of the satellites have the result that their mutual attractions upon each other give rise to curious results in making first one and then another swing back and forth in their orbits. The mathematical problems thus arising tax the abilities of the ablest investigators of the motions of these bodies.

Physical Constitution and Rotation of Saturn.—The physical constitution of Saturn would seem to be quite similar to that of Jupiter; but the former, being nearly twice as far as the latter, is more faintly illuminated by the sun, and more difficult of observation. Careful telescopic observations show that Saturn has a slightly mottled or cloudy appearance; but the mottling is so faint that it is impossible to locate any one feature, so as to follow it from hour to hour. It is, therefore, as a general rule, impossible to see the rotation of the planet. But on three occasions since the telescope has been used in observing Saturn, a spot or region of unusual brightness has been formed upon its disc which enabled its time of revolution to be observed. The first of these was in the time of the elder Herschel; the second in 1876, when the planet was carefully observed by Professor Hall; and the third in 1903, when a spot was discovered by Barnard and observed by many astronomers. On the second occasion it was found that the spot gradually spread out, the brightest point being near one end, while it gradually faded out at the other end. In consequence of this, it was impossible to fix the period of rotation with entire exactness, because it would depend upon whether we took the brightest part of the belt into which the spot was stretched, or the middle of the belt, as the point of comparison. The results of the time of revolution on the three occasions, so far as worked out, are as follows:

Herschel	10 h. 16 m.
Hall	10 h. 14 m.
Barnard	10 h. 38 m.

Very remarkable is the deviation of the last period from the two others. It is easy to

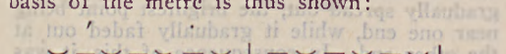
determine what this means. The white spots observed by Herschel and Hall were on or near the planet's equator, while Barnard's spot of 1903 was in middle latitude. We therefore conclude that Saturn is like Jupiter and the sun, in that its equatorial portions rotate in a less period than those nearer the poles.

Saturn also resembles Jupiter in its very small density, which is even less than that of water. We therefore reach the same conclusion as in the case of Jupiter — that the outer visible surface of this planet is probably gaseous; that the planet, in fact, is a ball of vapor surrounding a comparatively dense nucleus.

SIMON NEWCOMB.
Revised by ERIC DOOLITTLE.

SATURNALIA, the name of a Roman festival, instituted, according to the popular belief of the ancients, in commemoration of the happy period under the reign of Saturn, when freedom and equality prevailed, and violence and oppression were unknown. It originated probably as a harvest celebration. The festival continued at first one day; then three; afterward five; and finally, under the Cæsars, seven days, namely, from the 17th to the 23d of December. At the commencement of this festival a great number of wax tapers were lighted in the temple of Saturn, as a sign that no more human victims were to be sacrificed. During its continuance no public business could be transacted, the law courts were closed, the schools kept holiday, to commence war was impious and to punish a malefactor involved pollution. The slaves were freed from restraint, wore caps as badges of freedom and went about dressed in tunics, adorned with purple, and in white togas. Masters and slaves changed places; and while the servants sat and banqueted at the tables, they were waited on by their masters and their guests, who, if they did not do this, were obliged to submit to all sorts of ridiculous punishments. Jests and freedom everywhere prevailed; and all ceased from their various occupations.

SATURNIAN VERSE, a metre employed by the earlier Roman poets. It consists of two members; the first an iambic dimeter catalectic, the other a trochaic dimeter brachy-catalectic. It points to the transition from the accentual versification of Etruria and Latium to the quantitive verse of fully developed Roman literature modeled as this latter was on Greek usage. It was originally employed in the hymns to Saturn sung at harvest time, hence its name; and it is also found in extant fragments of Nævius, Livius Andronicus, Ennius, etc. The basis of the metre is thus shown:



which corresponds with the metre of the old jingle,

There was a man in our town | wondrous wise and cunning.

The metre is met with in all primitive forms of European poetry, whether Spanish, German, or Anglo-Saxon, and is the underlying measure for almost all ballad literature.

SATYRS, săt'ẽrs or sā'tẽrs, in Greek mythology, a race of woodland divinities, who were followers of Dionysus (Bacchus), and represent the luxuriant vital powers of nature. They are not mentioned by Homer, but Hesiod describes them as a worthless race, unfit for work. They were supposed to be the sons of Hermes (Mercury) and Iphthima, or of Silenus. They appear in early works of art and poetry as robust in human frame with bristly hair, broad snub-noses, ears large and pointed like those of animals, two little horny knobs on their foreheads and a tail like that of a horse or goat. They are described as being fond of wine (whence they frequently appear with a wine cup or a thyrsus in their hands), and of every kind of sensual gratification, whence they are often represented sleeping, playing musical instruments, or engaged in voluptuous dances with nymphs. Like all the forest and field deities, they were greatly dreaded by mortals. By later writers, especially the Roman poets, the satyrs are confounded with the Italian Fauns, and are accordingly represented with larger horns and goats' feet, although they were originally quite a distinct class of beings. Ancient sculptors were fond of representing the satyr whether in his coarser or finer type — one of the most famous specimens of Greek art being the Satyr of Praxiteles, in which the revolting animal features of the conception have disappeared, and the satyr is portrayed as a beautiful and graceful youth.

SAUCONITE, a zinc-bearing clay from mines at Friedensville, Pa.

SAUERKRAUT, sowr'krowt, a salted preparation of cabbage, much esteemed by German and other northern European people, and of which large quantities are prepared for winter use. The common white cabbages are taken when they have formed firm hearts; these are sliced into small pieces and packed in layers in a cask with culinary salt, a few juniper berries and caraway-seeds or cloves being added according to taste, the whole mass being packed down as hard as possible without crushing the slices and covered with a lid pressed down with weights. Partial fermentation sets in after some time, and the watery juice rises to the surface. This juice is poured off, and water containing a solution of salt is poured in and changed till it rises without a scum and a fetid smell. The cabbage is then fit for use, and is stored in a cool place in the barrels still under pressure. It may be eaten boiled in the same way as fresh cabbage, or stewed with bacon or salted meat.

SAUGER, or SAND-PIKE, a fish of the rivers and lakes of the northern Mississippi Valley, a pike-perch of the genus *Stizostedion*, and hence a relative of the wall-eyed pike. The sauger (*S. canadense*) is much smaller than the wall-eyed pike, seldom more than 18 inches long and one to two pounds in weight. It varies in quality and estimation both as food and as a game fish, but in some tributaries of the upper Mississippi affords good sport by trolling over ripples with a minnow. Its color is olive gray, the sides grassy or orange with dark mottlings, round black spots on the dorsal fins and a large black blotch on the base of the pectoral fin.

SAUGERTIES, sâ'gẽr-tĭz, N. Y., village in Ulster County, on the Hudson River at the mouth of Esopus Creek, and on the West Shore Railroad, about 12 miles north of Kingston. A ferry connects Saugerties with the New York Central and Hudson River Railroad at Tivoli, on the opposite side of the Hudson, and there are regular steamer communications with all the Hudson River ports. It is in an agricultural region, and has good water power for manufacturing. In the vicinity are bluestone and limestone quarries. The chief industrial establishments are factories for making writing-paper, blank-books, envelopes, cardboard and coated paper for lithographing purposes, and the pulp mills. There are also brick works and quarries, and a white-lead factory close by. The manufacturing and export products of Saugerties and the nearby villages are shipped mainly from Saugerties by water. The educational institutions are a high school, the public and parish schools and the Y. M. C. A. library and reading-room. There are several banks. The government is vested in a president and board of trustees. Pop. 4,013.

SAUGUS, sâ'gŭs, Mass., town in Essex County, on Lynn Harbor and Saugus River, and on the Boston and Maine Railroad, about four miles west of Lynn and 10 miles northeast of Boston. Within its corporate limits are the villages of East Saugus and Cliftondale. It is a residential section with several manufacturing establishments, chief of which are woolen mills, and boot and shoe factories. The town has a high school and graded elementary schools. Pop. (1920) 10,874.

SAUL, first king of Israel from about 1040 B.C. He was the son of a Kish, a wealthy and powerful Benjamite, was noted for his personal beauty and courage; and when the people became dissatisfied with the theocratico-republican constitution, was selected by Samuel for their king. He was not acknowledged by the whole people until after he had gained a victory over the Ammonites. Repeated successes over the Philistines, Edomites, Moabites, Ammonites, and even over a king beyond the Euphrates, confirmed his authority. But Samuel, offended by the encroachments of the king on the privileges of the priesthood, and by his disobedience to the commands of Jehovah in a war against the Amalekites, secretly anointed David as king. His reign was terminated by a catastrophe. A battle was fought against the Philistines at Mount Gilboa; the Hebrews fled, Jonathan and two other sons of Saul fell and the king slew himself with his own sword. David, whose skill in poetry equalled his musical genius, honored in a touching elegy the memory of his fallen friends and foes (2 Samuel i), who, «lovely and pleasant in their lives, were even in their death not divided; they were swifter than eagles, they were stronger than lions.»

SAUL. This «dramatic lyric» by Browning, one of the most popular of his poems, is founded on 1 Samuel xiv, 14–23, which tells how David by playing upon his harp exorcized the king's evil spirit. The first nine stanzas of 'Saul' were published in 1845; to these were later added seven stanzas, and the entire poem was published in 1855. Its noble and inspiring outlook on life, its profound emotional appeal, its fine imagery, its dramatic quality and the vigorous rush of its verse, place 'Saul' among the most remarkable of English lyrical poems. David is the speaker. As he and his friends are tending their sheep in the morning, he tells the story of the night when he sang and played before Saul. He finds the king in his tent, apathetic and almost unconscious. Saul must be aroused, made to feel the joy of life, quickened to a sense of his own personal worth. First, David plays the tunes to which the wild animals respond — the quail, the crickets, the jerboa; then, the tunes associated with simple human customs, the reaping, burying, marrying and worshipping. Saul begins to respond. David then sings the joy of living, of «our manhood's prime vigor» and of Saul's great place in the world. The king's spirit is roused; but the harpist must lead him far higher. So he sings of fame after death, of the place Saul shall hold in the memory of generations yet unborn; finally, of immortality and love, and of the Christ as the living embodiment of man's highest longings. Saul is restored. As the singer hastens homeward through the night, he receives nature's own attestation of the new law of love. Much of Browning's philosophy of life is embodied in 'Saul,' which contains ideas that also find expression in others of his shorter poems, notably in 'Abt Vogler' and 'Rabbi ben Ezra.'

MARION TUCKER.

SAUL, a Biblical tragedy in five acts, by Vittorio Alfieri (1749–1803), is generally regarded as his masterpiece. It is written in blank verse, or, rather, in unrhymed hendecasyllables, broken and varied, thus avoiding the monotony of the French Alexandrine verse which the author disliked. Alfieri, as he relates in his 'Vita' (Autobiography, Epoca IV, Cap. 9), had been reading with intense interest the Bible during a quiet stay in Rome (1782–84), and had his imagination enkindled by the fierce struggle between two opposite passions in the breast of Saul. Thus the idea of the tragedy came to him on 30 March 1782; and by 30 July the play was finished. Alfieri would have dedicated Saul to Pope Pius VI (Jean-Ange Braschi), but His Holiness thought it would be unbecoming to be associated in any way with a theatrical production. ('Vita,' 1783).

The tragedy was first performed in Florence, in 1793, by amateurs, in a private house before a small audience, with good success. 'Saul' is representative of Alfieri's genius, and has had the most constant success of all his tragedies on the stage. The superb tragic elements in the Biblical story have long made it a favorite for treatment by poets, sculptors, painters and musicians — witness 'Saul le furieux' of Jean de la Taille, the 'Saul' of Voltaire, and of A. Soumet, in France, of Paul Heyse and J. G. Fischer, in Germany, and of Aaron Hill, in England, and of Charles Heavysege, in America. In extreme simplicity of structure 'Saul' is like the author's other tragedies yet is less austere, in that humanity here reveals itself more pleasingly. While Alfieri sympathized with Saul in his conflict with the priesthood, that struggle does not form the main interest of the play; nor is David, the instrument of God, at all like the tyrants who represent the opposition in most of Alfieri's tragedies, but on the contrary he grows throughout the plays in nobility, loyalty

and tenderness. Saul, a prey to conflicting emotions, perishes not because of his crimes or passions, but through remorse, intensified by the terror which has taken possession of his soul. The 'Song of David' in the third act is one of the gems of Italian lyric poetry. A useful edition of 'Saul,' well annotated, is that of Mario Menghini (Florence 1893).

JAMES GEDDES, JR.

SAULSBURY, Willard, American lawyer and legislator: b. Georgetown, Del., 17 April 1861. He was educated at the University of Virginia, and was admitted to the bar in 1882, since when he has been engaged in law practice at Wilmington, Del. He came of a family prominent in Democratic political circles in Delaware, was delegate at large from Delaware at the Democratic National conventions in 1896, 1904 and 1912. He was United States senator in 1913–19, afterward returning to private life. He consolidated the street and electric railroads of Wilmington, and is director in various banks and trust companies.

SAULT SAINTE MARIE, soo'sānt mā'rĭ or (Fr.) sō sānt mä-re, Canada, town and port of entry of Algoma District, Ontario, on the Saint Mary River, the Sault Sainte Marie Canal and on the Canadian Pacific and Algoma Central railways. It is connected by the international bridge, one mile long, with Sault Sainte Marie, Mich., hence with the Duluth, South Shore and Atlantic and the Minneapolis, Saint Paul and Sault Sainte Marie railways. It is in an agricultural and mining region and is a popular summer resort. In addition to the ship canal around the rapids, Sault Sainte Marie has a large power canal, which already supplies important industries and will supply power to future manufactories. The most important industry is the manufacture of wood-pulp and paper, the large mill at Sault Sainte Marie having cost in construction more than $1,000,000 and being one of the largest in the world. There are also nickel steel works, utilizing the nickel ores from the Sudbury mines, foundry and machine shops and lumber mills. The city owns and operates its electric-lighting plant and waterworks. A new power plant is under construction. It is the seat of the Anglican bishop of Algoma and the Roman Catholic bishop of northern Canada; has good schools, banks and weekly newspapers. Pop. with Steelton adjoining, absorbed in 1917 (1921) 21,228.

SAULT SAINTE MARIE, Mich., city, port of entry, county-seat of Chippewa County, on Sainte Mary's River, near the outlet of Lake Superior, on the Sault Sainte Marie (q.v.) Ship Canal and on the Duluth, South Shore and Atlantic and the Minneapolis, Saint Paul and Sault Sainte Marie railroads. The international railroad bridge across Saint Mary's River connects the city with the city Sault Sainte Marie in Canada, thus making direct connections with the Canadian Pacific Railroad. The principal industrial products are calcium carbide and leather; other manufactories are machine shops, foundries, planing mills, woolen mill and shingle mills. It has a shipyard, large lumber yards and warehouses. Two hydro-electric plants develop approximately 5,000 horse power from the falls of the Sault Rapids. About 75,000,000 tons of freight are passed down the Sault locks annually. The total value of imports for the fiscal year ending 30 June 1918 was $12,934,377; while that of exports for the same period amounted to $10,000,000. A branch of the State fish hatchery is maintained here. There are 12 churches representing the various denominations. The educational institutions are Loretto Academy, a high school, public and parish schools and private business schools. The three banks have a combined capital of $300,000, and there are also two building and loan associations. The city's property assessment in 1918 was $15,654,960. The locality has a romantic place in United States and Canadian history, and before the white man it must have been, from its situation, a well-known passing point on Indian trails; it is known to have been one of the favorite fishing grounds of the Chippewa Indians, and the first explorer as early as 1634 found about 2,000 natives living here. The French missionaries Rambault and Jogues visited this locality in 1641, followed by Père Menard in 1660; and a mission was established by Jacques Marquette in 1668, which, however, was abandoned 20 years later, the settlement continuing as a trading post. It was at Sault Sainte Marie that the governor-general of New France gathered a great council of Indians in 1671, and in the name of the king of France took formal and solemn possession, by proclamation, of all the country south to the Gulf of Mexico and west to the Pacific Ocean. Pop. (1920) 12,096.

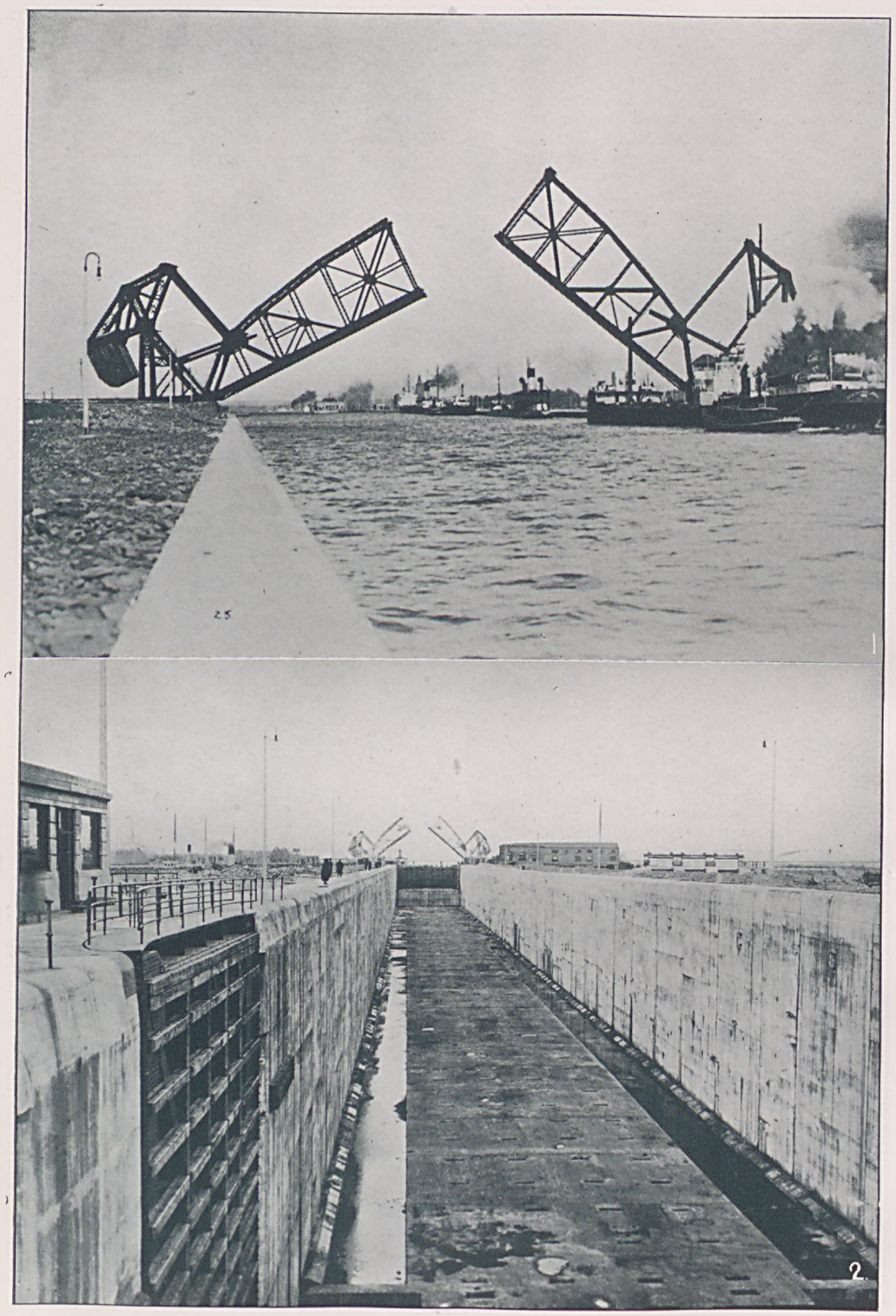
SAULT SAINTE MARIE, soo sānt mā'rĭ, or French, sō sānt mā're', **SAINT MARY'S FALLS,** or the **"SOO" CANALS.** The early trappers and traders of the Northwest found free navigation insuperably impeded by the sault, or rapids of the Saint Mary's River, whose descent of 18 feet to the mile compelled costly portaging of the increasing cargoes of furs and merchandise. Finally, the Northwest Company, seeking to gain an advantage over its rival, the Hudson's Bay Company, constructed a canal with a single lock on the Canadian side of the Falls. This was in 1797–98, and the canal was in use by canoes and bateaux until 1814, when all but its timber floor and sills was destroyed by United States troops. No further attempts at canal building in this remote spot were made until 1853, when a ship canal — the first within the borders of the United States — was begun by the State of Michigan, to connect lakes Superior and Huron, and was finished in 1855. The length of the canal was 5,674 feet, and it was provided with two tandem locks, each being 350 feet in length and 70 feet wide, and allowing passage of vessels drawing 12 feet, the original cost being $1,000,000. The United States government, by consent of the State, began in 1870 to enlarge the canal, and by 1881 had increased its length to 1.6 miles, its width to an average of 160 feet, and its depth to 16 feet; also had built a single lock, called the Weitzel Lock, 515 feet long and 80 feet wide, with a depth of 17 feet on the sills, which was located 100 feet south of the State and arranged for an average lift of 18 feet locks. The State relinquished all control of the canal in March 1882. In 1887 the State locks were torn down and replaced by a single lock 800 feet long, 100 feet wide and a depth of 21 feet of water on the sills. This lock, called the

SAULT SAINTE MARIE



1 Nutzel, Poe, Davis, and Sabin Locks

2 Opening of Fourth or Sabin Lock



1 Jack-Knife Bridge

2 Sabin Lock showing construction

«Poe» lock, built at a cost of $3,000,000, was put in commission in 1896. The canal was also deepened to 25 feet. From 1892 to 1903 many millions of dollars were expended in laying out a new and straighter route through Hay Lake and other channels, eliminating a number of short turns and giving dredged areas over 30 miles in length. This was one of the chief causes of the reduction of the cost of the freight-ton through the canal from 13.57 mills in 1882 to 3.53 mills in 1909. A new work of great importance was begun in 1908. It consisted of the widening and deepening of the canal above the locks and in the Middle Neebish channel, and the construction of the new canal and the great Davis lock. This work was completed in 1914 at a cost of $5,000,000, the result being that the canal is now 500 feet wide at the upper entrance, 270 feet at the basin, 108 feet at the lock gates and 1,000 feet wide at the lower entrance. The improved Middle Neebish channel is now 300 feet in width and has 22 feet of water over the rock at mean low stage level of Lake Huron. The excavations for the third or Davis lock were completed early in 1912 and allowed for a lock chamber 1,350 feet long and 80 feet wide with a minimum depth of 24 to 25 feet below extreme low water. A separate and free waterway was also constructed to feed the new locks. One result of the opening of the new lock in 1914 was that the largest sized bulk freighters, which since 1895 had been using the Canadian canal, began again to take advantage of the United States canal. (See below).

The plans adopted in 1907 were designed with a view to affording an approach also to a fourth lock, with the same dimensions as the third, and an appropriation was noted in 1912, and work on the excavations commenced soon thereafter. The lock pit was finished in the spring of 1915, the masonry work was half completed by the beginning of 1917, and the lock was opened for navigation in 1919, the cost being $3,275,000. The great length of the third and fourth locks, 1,350 feet as compared with 1,000 feet in the Panama Canal, enables sometimes as many as five ships to go through in one lockage. As many as 125 ship passages are made in these locks in a single day. The new jack-knife bridge which spans the canal, providing means for passing over the third and fourth locks, is claimed to be the largest bascule bridge in the world. Besides the canals on the American side of the international line, the Dominion government opened a large Canadian canal in 1895. This canal is one and one-eighth miles long, 150 feet wide and 22 feet deep, with a lock 900 feet long and 60 feet wide, with 22 feet on the mitre sill. (See CANADIAN CANALS). The commerce passing through these canals which are toll-free eight months of the year is far greater than is borne by the Suez Canal, the Kiel Canal and the Manchester Canal combined in a whole year; the commerce of the Erie Canal, the Welland Canal and the canals of the Saint Lawrence may be added and the aggregate will still fall short of the tremendous tonnage passing through the «Soo» canals. It reached in 1910 a total of 62,363,218 tons — an increase of 4,468,069 over 1909. The total freight traffic passing through the United States locks in 1915 was 71,290,304 short tons, and in 1916 it totaled 92,000,000. Through the Canadian canal the freight totaled 16,816,649 tons. In 1918 the cost of operating the American canals amounted to $120,000, averaging less than two mills per ton of freight.

SAUMAREZ, sō-mä-rā', or **SAUSMAREZ, James**, BARON DE, British naval officer: b. Saint Peter Port, Guernsey, 11 March 1757; d. there, 9 Oct. 1836. He served in the American War; was raised to the rank of commander after the engagement between the English and Dutch in 1781, and was captain of the *Russell* in the combat between Rodney and De Grasse. In 1793 he was knighted for the capture of the *Réunion*, a French frigate. In March 1795 he was appointed to the command of the *Orion*, in which ship he opened the battle of L'Orient, in which the French fleet was defeated, 23 June; he shared in the victory off Cape Saint Vincent, 14 Feb. 1797, and was second in command to Lord Nelson in the victory of the Nile, 1 Aug. 1798. In 1801 he was made rear-admiral, created a baron and appointed to the command of the squadron cruising off Cadiz. He defeated a Franco-Spanish fleet of 10 sail of the line and four frigates. At the beginning of the war with Russia (1809) he commanded the Baltic fleet. In 1821 he became vice-admiral of Great Britain, was raised to the peerage of the United Kingdom with the title of Baron de Saumarez of Saumarez, in 1831, and thenceforth lived in retirement. Consult Ross, 'Memoirs of Admiral Lord de Saumarez (1838).

SAUNDERS, sän'derz, **Alvin**, American legislator: b. Fleming County, Ky., 12 July 1817; d. Omaha, Neb., 1 Nov. 1899. He removed with his parents to Illinois in 1828, and at 16 went to Iowa. He studied law, was postmaster for seven years and eventually became a banker. He was a member of the convention which framed the constitution under which Iowa was admitted to statehood, was State senator for eight years and a commissioner to organize the Pacific Railroad Company. In 1861–67 he was governor of the Territory of Nebraska and during the Civil War sent 3,000 troops to the front besides repelling the attacks of the Indians, although the entire population of the Territory numbered but 30,000. He served in the United States Senate in 1877–83, was active in the movement for the resumption of specie payment, secured a labor school for the Indians on the Pawnee Reservation, obtained 600,000 acres for Nebraska by straightening its northern boundary line, and was prominent as a commissioner on Indian affairs.

SAUNDERS, Frederick, American librarian, publisher and author: b. London, England, 14 Aug. 1807; d. New York, 12 Dec. 1902. He came to the United States in 1837 and established in New York a branch of his father's publishing business, and did some earnest if unsuccessful pioneer work in the interest of an international copyright law, a project in which he had the support of Irving Bancroft, Bryant and other famous authors. He was city editor of the New York *Evening Post* for a time; and in 1859 he became assistant librarian at the Astor Library, filling the office of chief librarian in 1876–96, when he resigned. He was well known as a contributor to magazines and reviews and was author of 'Salad

for the Solitary by an Epicure' (1853); 'About Woman, Love and Marriage' (1868); 'Pastime Papers' (1885); 'Character Studies' (1894), etc.

SAUNDERS, Richard, the name under which Benjamin Franklin published his 'Poor Richard's Almanac' (1732–57).

SAUNDERS, Thomas Bailey, English author: b. Alice, Cape Colony, 2 Dec. 1860. He was educated at King's College, London, and at University College, Oxford, became a barrister in 1886 and has since engaged in literary work. He has made translations of much of the work of Schopenhauer and Goethe and has written 'Life and Letters of James McPherson' (1893); 'The Quest of Faith' (1899); 'Prof. Harnack and His Oxford Critics' (1902); 'Schopenhauer' (1901), etc.

SAUNDERS, William, Canadian agriculturist, pharmacist and entomologist: b. Devonshire, England, 16 June 1836; d. 13 Sept. 1914. He accompanied his parents to Canada in 1848 and became a manufacturing chemist at London, Ontario. Becoming extensively interested in agriculture, he made a study of soils and insect pests, and did much to further the development of scientific agriculture in Canada. He was professor of materia medica at Western University in 1882–85 and public analyst for western Ontario in 1882–86. He was one of the founders of the Ontario College of Pharmacy and served as its president for two years. In 1885, under government direction, he investigated agricultural experiment work in the United States and Europe, his report resulting in the establishment of the Canadian experiment farms, of which he was in charge in 1886–1911. He was a founder of the Ontario Entomological Society, and was one of the original fellows of the Royal Society of Canada, of which he was president in 1900. Author of 'Insects Injurious to Fruit' (1882; 2d ed., 1898).

SAUNDERS, William Lawrence, American engineer and inventor: b. Columbus, Ga., 1 Nov. 1856. He was graduated at the University of Pennsylvania in 1876, and in 1878–81 he was with the National Storage Company at Communipaw, N. J. He was afterward president of the Ingersoll-Sergeant Drill Company and an officer in other companies manufacturing tools and machinery. He invented a compressed air system of pumping liquids; a drill for use upon submerged rocks, and the Ingersoll track and bar channelers for quarrying stone. In 1915 he was appointed to the United States Naval Advisory Board and subsequently became its chairman. Author of 'Compressed Air Information' (1903); 'Compressed Air Production,' and joint author of 'Subways and Tunnels of New York; 'Rock Drillings.'

SAUREL, a fish. See SCAD.

SAURIA, sâ'rĭ-a, a term variously applied in the classification of the reptiles, but in this work restricted to designate the subclass composed of the orders *Lacertilia* (lizards) and *Ophidia* (serpents). In popular speech the phrase «saurian reptiles» usually means alligators or crocodiles. See REPTILES.

SAURIN, Jacques, zhăk sō-răn, French Protestant preacher: b. Nimes, 6 Jan. 1677; d. The Hague, 30 Dec. 1730. After study at Geneva he became pastor in 1701 of a Walloon congregation in London, but in 1705 went to The Hague to take charge of a church of French refugees assembling there in a chapel of the Prince of Orange. Here his pulpit oratory was so greatly admired that it roused the bitter envy of his clerical brethren, who charged him with heresy and subjected him to a series of petty persecutions which shortened his life. His doctrines were those of moderate Calvinism. As a pulpit orator he has been likened to Bossuet, and so far as vigor of presentation goes this may be thought just. He was the author of 12 volumes of 'Sermons,' selections from which were translated into English, and published between 1775 and 1784 in five volumes (with a 'Memoir'), a sixth being added in 1796. Among his other works are 'Etat du Christianisme en France' (1725); 'Abrégé de la théologie et de la morale Chrétienne' (1722); 'Discours sur les evénements les plus mémorables du vieux et du Nouveau Testament' (1720–28). Consult 'Life' by Berthault (1875).

SAUROPODA, sâ-rŏp'ō-da, a sub-order of dinosaurian reptiles which included gigantic forms, such as *Brontosaurus, Morosaurus, Diplodocus* and the like. (See DINOSAURIA). It is difficult, remarks Gadow, to understand how these huge, long-necked *Sauropoda* lived and moved about. The long neck suggests at first sight predaceous habits, but the teeth, rather feeble in *Diplodocus,* and distinctly of the plant-cutting type in other genera, put this out of the question. The high position of the impaired nasal opening, and the shortened nasal bones of *Diplodocus* are features indicative of aquatic habits, but the short-toed plantigrade limbs are absolutely adapted to terrestrial life, and we cannot well assume that such enormous brutes as *Atlantosaurus* could possibly have ventured into swampy ground.

SAUROPSIDA, a primary division of vertebrated animals, comprising the reptiles and birds, the other two corresponding divisions being the *Ichthyopsida* (fishes and amphibians) and the *Mammalia.* These divisions, set apart by Huxley, are in accordance with genetic relationships. For the similarities in structure between birds and reptiles, showing descent from a common sauropsidan ancestor, see ORNITHOLOGY; REPTILES.

SAURURÆ, the name given by Huxley to an order of the class of birds (see ORNITHOLOGY), constructed for the reception of *Archæopteryx* (q.v.), a fossil bird, the oldest and most primitive bird-fossil known, remarkable for its lizard-like tail.

SAURY-PIKE, or **SKIPJACK,** a fish (*Scomberesox saurus*), having a greatly elongated body covered with minute scales and the jaws prolonged into a long sharp beak. It is about 15 inches long, occurs plentifully on the north Atlantic coasts, frequenting inlets in shoals so dense that it may be taken in pailfuls. In order to escape the pursuit of the porpoise and large fishes it often leaps out of the water or skims rapidly along the surface. Consult Goode, 'American Fishes' (1888).

SAUSAGE, an article of food consisting of minced meat, highly seasoned, and enclosed generally in the intestines of some animal. Among the Romans the sausages of Lucania were held in high repute; they were made of fresh pork and bacon finely minced with nuts of the stone-pine, and flavored with pepper, cummin seed, bay leaves, pot-herbs and garum. The Bologna sausages of Italy are still highly prized; they consist of veal, salt beef, salt pork and bacon, finely chopped up, seasoned with sage, mixed herbs, ground pepper and mixed spice. The smoked sausages of Germany are also considered as a delicacy by many; they are made of fat and lean pork preserved for about a week by salt, saltpetre, black pepper and alspice being rubbed into the meat; it is then cut small and mixed with some shreds of shallot or garlic, pressed into an ox-skin, wrapped in a fold or two of muslin and then smoked in the same way as ham. The pork sausages of our own country are made and seasoned in various ways to please different palates. See MEAT PACKING; MEATS AND MEAT PRODUCTION.

SAUSSURE, sō-sūr, Horace Bénédict de, Swiss savant: b. Conches, near Geneva, 17 Feb. 1740; d. Geneva, 22 Jan. 1799. He began his studies in natural science in Geneva and at 22 was appointed professor of philosophy. Later he was elected member of the Council of Two Hundred in the new legislature of his country. His name has since become famous from his services to geology, geodesy, the geographical distribution of plants and the applied sciences. His most remarkable work was done in the investigation of plant anatomy. In pursuit of his chosen studies he traveled through France, Holland, England, Italy and Sicily; thoroughly exploring the Alps, especially the glaciers of Chamounix, and was the first to reach the summit of Mont Blanc (1787) and to measure its height by barometric pressure. He is also the inventor of the electrometer, hydrometer and similar instruments. As founder and president of the Society of Arts of Geneva he did good service to the industries of that city. Among his writings the most important are 'Voyages dans les Alpes' (1779) and 'Partie Pittoresque' (1890).

SAUTERNE, sō-tĕrn', a white Bordeaux wine of high repute, produced from grapes grown in the neighborhood of Sauternes, a village in the department of Gironde, near Bordeaux.

SAUVEUR, sō'vĕr, Albert, American metallurgist: b. Louvain, Belgium, 21 June 1863. He studied at the Liége School of Mines, and, coming to the United States, was graduated at the Massachusetts Institute of Technology in 1889. He was chemist and metallurgist in different steel works until 1897; and in 1897–1905 he owned and directed the Boston Testing Laboratories. He lectured on metallurgy at the Massachusetts Institute of Technology in 1898–1903; was connected with the Harvard University faculty from 1899, and since 1905 has been professor of metallurgy there, also holding that position at the Massachusetts Institute of Technology since 1917. In 1917 he became metallurgist with the American Aviation Commission in France and has also served since that time as metallurgical expert for the French Ministry of Munitions. He edited the *Metallographist* in 1898–1903 and the *Iron and Steel Age* in 1903–06. Author of 'Metallography of Iron and Steel' (1912); 'Germany and the European War' (1915).

SAVAGE, Edward, American portrait painter and engraver: b. Princeton, Mass., 26 Nov. 1761; d. there, 6 July 1817. He was a goldsmith and engraver in early life, but eventually turned to portrait painting, and established his reputation through his portraits of Washington, who sat for him several times, and of whom he in 1790 finished the portrait painted as a gift to Harvard. He studied abroad in 1791–94, under West in London and later in Italy. On his return to the United States he established a studio in Philadelphia and later painted in New York, maintaining there for many years an art gallery. He painted portraits of Thomas Jefferson, Anthony Wayne, Knox and other famous persons; finished R. E. Pine's 'Congress Voting Independence' (Philadelphia Historical Society), and executed 'Family Group at Mount Vernon' (1796), as well as making many steel engravings of his own portraits.

SAVAGE, Henry Wilson, American theatrical manager: b. New York, 19th century. He was graduated at Harvard University in 1880 and afterward engaged in the theatrical business. He is president of the Henry W. Savage Company and of the Castle Square Opera Company, Boston; and is director of the National Association of Theatrical Producing Managers of America.

SAVAGE, James, American antiquarian: b. Boston, Mass., 13 July 1784; d. Boston, 8 March 1873. He was graduated from Harvard in 1803, studied law, was admitted to the bar, served in both branches of the legislature and then retired from political life to engage in literary work. He published numerous historical and political pamphlets and edited many works concerning New England history. His work is unfortunately marred by a partisan spirit and is somewhat confused in plan. He wrote 'Genealogical Dictionary of the First Settlers of New England, showing three Generations of those who came before May 1692' (4 vols., 1862–64), and edited Winthrop's 'History of New England' (1825–26); Paley's 'Works' (5 vols., 1828), etc.

SAVAGE, Minot Judson, American Unitarian clergyman: b. Norridgewock, Me., 10 June 1841; d. 22 May 1918. He studied at Bowdoin College, and thereafter was graduated from Bangor Theological Seminary in 1864 and for three years (1864–67) was a Congregational home missionary, in California. There he established churches in Grass Valley and San Mateo. He occupied Congregational pulpits in Framingham, Mass., and Hannibal, Mo. (1867–69), (1869–73). Becoming a Unitarian he was made pastor of the Third Unitarian Church in Chicago (1873–74), and a year later became pastor of the church of the Unity, Boston, where he remained for 22 years. In 1896 he became pastor of the church of the Messiah, New York City, resigning the pastorate in May 1906. He represented the more radical element of his denomination and was the first clergyman who accepted «evolution.» He was a voluminous writer upon ethical and religious subjects. Among his many books are 'Christianity the Science of Mankind' (1873); 'The Religion of Evolution' (1876);

'Social Problems' (1886); 'My Creed' (1887); 'Religion of To-Day' (1897); 'Our Unitarian Cause' (1898); 'Life Beyond Death' (1901); 'Life's Darkest Problems' (1905); 'The Passing and Permanent in Religion' (1901).

SAVAGE, Richard, English poet: b. London, 10 Jan. 1698 (?); d. Bristol, 1743. He claimed to be the illegitimate son of Anne, Countess of Macclesfield, by Richard Savage, Earl Rivers, but was probably the son of a woman who had been employed to nurse a natural son of the countess by that earl. This child, according to the countess, died when quite young, and she declared that Savage was an imposter. Savage was apprenticed to a shoemaker, having probably received some education at a grammar school near Saint Albans. He turned to literature and became an author as a means of livelihood. His first work, a pamphlet on the Bangorian controversy, was followed by two comedies, 'Woman's a Riddle,' performed in 1716, and 'Love in a Veil.' These procured him the acquaintance of Sir Richard Steele and Wilkes, the actor. His tragedy, 'Sir Thomas Overbury,' was brought out in 1723, the author himself playing the leading part, but with little success. Savage was rising in reputation when, in 1727, he killed a man in a tavern brawl. He was tried and sentenced to death, but through the influence of Lady Hertford was pardoned. In 1728 appeared 'The Bastard,' a poem of some merit. Soon after Lord Tyrconnel (a nephew of his alleged mother) received him into his house and allowed him £200 a year. In 1729 he published 'The Wanderer: a Moral Poem.' A quarrel with his patron once more turned him adrift upon the world. A birthday ode addressed to Queen Charlotte in 1732 procured him a pension of £50 from the queen. In 1735 a satire against the clergy, entitled 'Progress of a Divine,' caused a prosecution to be instituted against him; but the information was dismissed. From this period he appears to have sunk into the lowest misery. The death of the queen and the loss of his pension completed his ruin, although Pope and a few friends raised a subscription with a view of enabling him to reside in Wales. But at Bristol he was arrested for debt and thrown into the county jail, where, after a detention of some months, he died. Besides the works above mentioned he was the author of much occasional verse and other miscellaneous writings. Savage was the friend and companion of Samuel Johnson at the time when the latter was sleeping in the streets of London houseless and penniless. Consult Johnson, 'Life of Savage' (1744); Galt, 'Lives of the Players'; Boswell, 'Life of Johnson'; Thomas, in 'Notes and Queries' (1858).

SAVAGE, Richard Henry, American soldier and novelist: b. Utica, N. Y., 12 June 1846; d. New York, 11 Oct. 1903. He was graduated from West Point in 1868 as brevet second lieutenant and in 1871 served as vice-consul of the United States at Rome and Marseilles. In 1872 he was military secretary, with the rank of major, in the Egyptian army and in the latter part of 1872 and during 1873 was United States commissioner to Texas, to settle the Mexican-Texas border dispute. During the Spanish-American War he served as senior major of the United States volunteer engineers. He was a voluminous writer and published among other books 'My Official Wife,' which has been translated into 17 languages; 'For Love and Life'; 'In the Shadow of the Pyramids'; 'Brought to Bay'; 'The Midnight Passenger' (1900).

SAVAGE ISLAND, or **NIUE,** an island of the south Pacific, 40 miles in circumference, and lying between the Samoa and Tonga groups. It is very fertile. Chief products—copra, coffee and fruit. Trade is almost exclusively with New Zealand, to which it was annexed in 1901. The inhabitants are a mixed race of Samoans and Melanesians. They are a quiet people and have become Christians. They speak a Samoan dialect.

SAVAGE STATION, Battle of. While General Sumner was engaging General Magruder at Peach Orchard or Allen's Farm on the morning of 29 June 1862, General Franklin was informed that "Stonewall" Jackson, after repairing the bridges, was crossing the Chickahominy in force and advancing toward Savage Station. Franklin immediately withdrew Smith's division from an isolated and exposed position on Sumner's right and notified Sumner, who at 12 o'clock fell back two and one-half miles to Savage Station and united with Franklin, who had Smith's division only, Slocum's having been sent by McClellan across White Oak Swamp. McClellan had ordered Heintzelman, with his corps, to hold the Williamsburg road until dark, at a point where were several field-works and a skirt of timber between these and the railroad; but through a misunderstanding of his orders, and being convinced, he says, that the whole open space near Savage's was crowded with troops, more than he supposed could be brought into action judiciously, in the afternoon he marched his entire corps, except two batteries, to the rear across White Oak Swamp, without orders from any one, and without a word to Sumner, who, by seniority, was in command, McClellan not being on the field. On reaching Savage Station, Sumner and Franklin drew up in line of battle in a large open field to the left of the railroad, the left, held by Sumner, resting on the edge of the woods, Richardson's division forming his right, Sedgwick's his left. Smith's division on the right extended down to the railroad, with Hancock's brigade reaching into the woods to the right and front to hold the railroad. Davidson's brigade was in reserve, and Osborn's battery was on the line. It was after these dispositions had been made that Heintzelman withdrew and imperiled the left of Sumner's line. Magruder had slowly and cautiously followed Sumner from the Peach Orchard and it was near 5 o'clock when McLaws' division, moving along the Williamsburg road and through the timber that Heintzelman was supposed to be holding, began an attack upon Sumner's left, and was held in check by the vigorous fire of Sumner's artillery. McLaws pressed his attack with great impetuosity, and a hotly contested fight took place on the Williamsburg road. Six regiments of Sedgwick's division, followed by one of Richardson's, were hastened to the threatened point; Brook's Vermont brigade was thrown into the woods that Heintzelman had abandoned, six batteries opened fire, and at dark, after partial success on either side, the battle ceased, with Sumner's line intact, and the Confederates repulsed. A novel feature of the engagement was the use by the Confederates of a 32-pounder gun, mounted on a platform-car, plated with iron, which was pushed down the railroad, and sent its shells into Sumner's line. Soon after the cessation of the fight, and the destruction of a large amount of supplies, Sumner continued the retreat across White Oak Swamp, abandoning to the Confederates 2,500 sick in the hospitals. McLaws reports a loss of 345 killed and wounded; the total Confederate loss was about 400 killed, wounded and missing. The Union loss is not accurately known.

Consult 'Official Records' (Vol. XII); Webb, 'The Peninsula'; Walker, 'History of the Second Army Corps'; Allan, 'Army of Northern Virginia'; The Century Company's 'Battles and Leaders of the Civil War' (Vol. II).

E. A. Carman.

SAVAII (sä-vī'ē) **ISLAND.** See Samoan Islands

SAVANILLA, one of the names of the great tarpon (q.v.).

SAVANNA, Ill., city in Carroll County, on the Mississippi River, 130 miles northwest of Chicago, on the Chicago, Milwaukee and Saint Paul and the Chicago, Burlington and Quincy railroads. It is a shipping point for the produce of the district; has grain elevators, and manufactures sash and doors. Pop. (1920) 5,237.

SAVANNAH, Ga., city and capital of Chatham County, on the Savannah River, 18 miles from its mouth. It is the northern terminus of the Atlantic Coast Line system; the eastern terminus of the Central of Georgia Railway; the southern terminus of the Charleston and Savannah Railroad, a part of the Atlantic Coast Line, and the chief south Atlantic terminus of the Southern Railway and the Seaboard Air Line systems; also Savannah and Atlanta Railway, Savannah and Statesboro Railway and Midland Railway, thus being one of the most important railroad centres in the South. It has regular steamship and sailing connections with Boston, New York, Baltimore, Philadelphia, Jacksonville, West Indies, Central and South America, and other ports.

Commerce.—Next to New Orleans, Savannah is the most important commercial city in the South. It is the greatest cotton port on the Atlantic Coast of the United States. It has a water frontage of seven and one-half miles. The largest sea-going vessels load at the city wharves, and the river is navigable by steamers as far as Augusta. It has large exports of cotton, lumber, fertilizers, tobacco and naval stores. The value of its foreign exports aggregating $104,286,925 places Savannah second in position on the Atlantic Coast in the value of foreign exports.

Manufactures.—The number of industries and their products has largely increased in recent years. The industries include fertilizer plants, cotton-seed oil mills, iron foundries, saw mills, planing mills, rice and flour mills, cotton mills, furniture, sash, doors and blind, broom and varnish factories, printing offices, book binderies, a lithographing establishment, sugar refinery and barrel manufacturers. About $10,250,000 is invested in local manufacturing interests, and the annual value of products reaches about $16,710,000.

Banks and Banking.—There is one national and 10 State banks and nine savings and loan associations, which are under State control, with a total cash capital and surplus of approximately $10,500,000, with deposits approximately $50,000,000. The bank clearances for the year ending 1918 were $435,619,000. The largest State bank south of Baltimore and fourth largest in the entire South is located at Savannah, Ga.

Public Buildings.—The city has a county courthouse, United States post-office and courthouse, city hall, custom-house, arsenal of the First Battalion heavy artillery, armory of First Regiment of infantry, chamber of commerce, cotton exchange, board of trade, Saint Joseph's Hospital, Episcopal Orphans' Home, Savannah Hospital, Telfair Hospital for Females, Masonic Temple, theatre, Odd Fellows' Home, Georgia Historical Society, public library, Telfair Academy of Arts and Science, Auditorium and many large buildings of modern architecture. Ten miles from the city is the Bethesda Orphan House, founded by Rev. George Whitefield in 1740.

Churches and Schools.—Prominent among the church buildings are Christ Church, Wesley Monumental Church, Trinity Methodist Church, First Baptist Church, Saint John's Church, Saint John's Roman Catholic Cathedral, Hebrew Synagogue Mickva Israel and Independent Presbyterian Church. There are over 30 churches in the city, 13 of which are for colored congregations. The city also has the Convent of Saint Vincent de Paul and an excellent public school system. There are 9,000 enrolled pupils in the public schools, which are maintained at an annual expense of $125,000.

Parks and Monuments.—The streets are wide and beautifully shaded and intersected with parks or squares at regular intervals. In Johnson, Monterey and Madison squares are monuments to Nathanael Greene, Count Pulaski and Sergeant Jasper, heroes of the Revolution. In Forsyth place stands a monument to the Confederate dead. There is also a monument to Tomichichi, the Indian chief, and other public memorials.

Government.—The city is governed by a mayor and city council. The annual cost of maintaining the municipal government is about $1,200,000. The artesian waterworks system, with 58 miles of mains, cost $1,250,000. The city has an area of seven square miles with 98 miles of streets, of which 35 miles are paved. The sewer system covers 18 miles of mains. The streets are lighted by electricity at an annual cost of $39,000; the police department costs annually about $90,000, and the fire department $85,000.

History.—Savannah was founded by Gen. James Oglethorpe in 1733 and was chartered in 1789. In 1778 the British captured the city. In October of the following year it was besieged by the American and French forces, and in a battle fought on the 9th of that month the combined armies were defeated. In this assault Count Pulaski was mortally wounded. The town remained in the possession of the British until the close of the Revolutionary

War. During the Civil War the city was a prominent depot of supplies for the Confederate armies and was the objective point of General Sherman in his march to the sea. After a brief defense it was evacuated by the Confederates and the Union army took possession 21 Dec. 1864.

Population.— In 1850 the population was 15,312; in 1900, 54,244. The corporate limits of the city have since been extended and the population in 1910 had increased to 65,064. At present (1920) the population is 83,252.

THOMAS PURSE,
Secretary of Savannah Board of Trade.

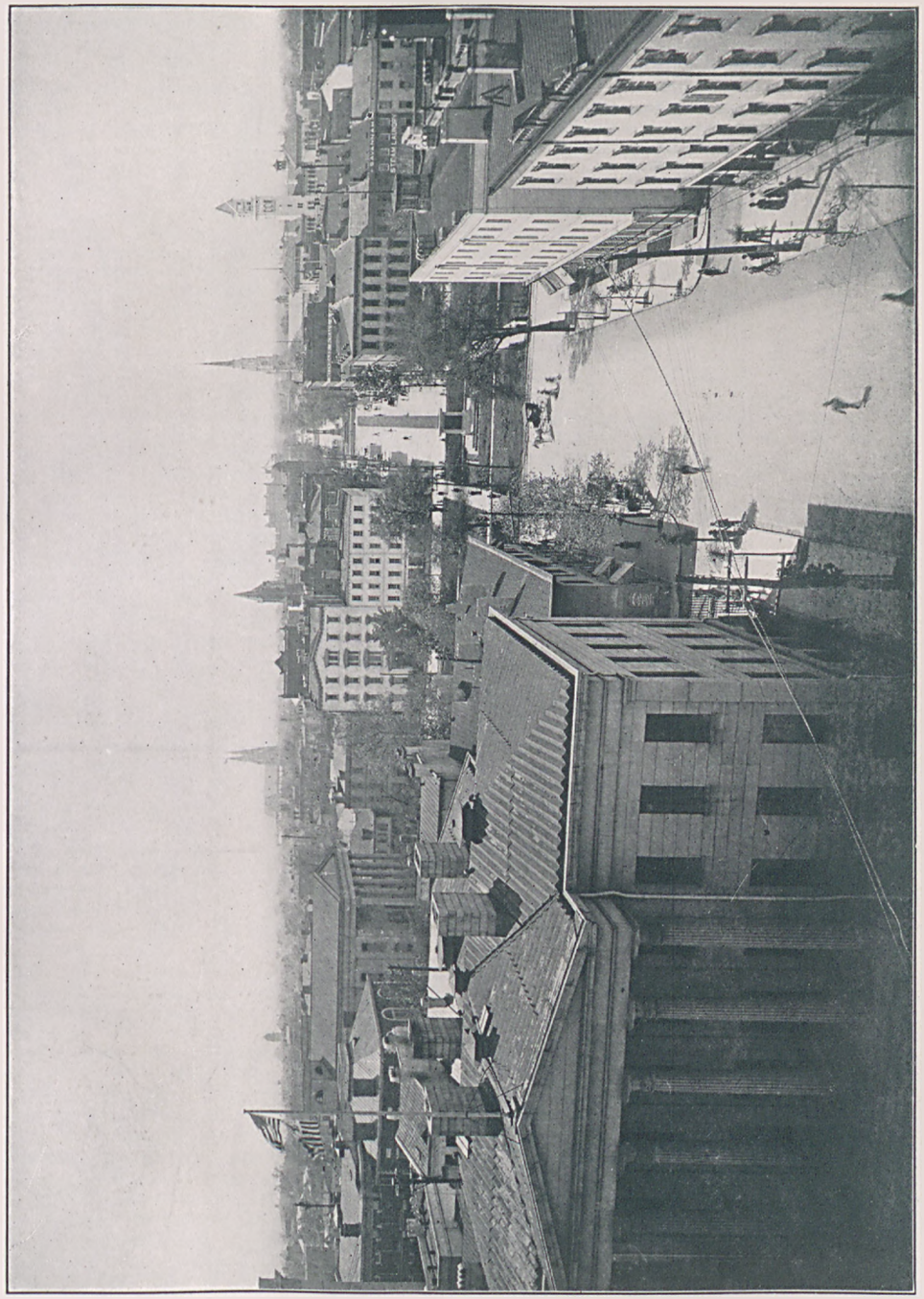
SAVANNAH, Mo., city, county-seat of Andrew County, on the Chicago Great Western and the Kansas City, Saint Joseph and Council Bluffs railroads, 13 miles north of Saint Joseph. It was settled in 1842 and was incorporated as a city in 1854. It is the centre of an agricultural, fruit-growing and stock-raising region, and has a flour mill and a creamery. The city has a public high school with a school library of over 700 volumes. Pop. (1920) 1,831.

SAVANNAH, a river formed by the junction of the Tugaloo and Seneca rivers, and which, from its source, forms the boundary between Georgia and South Carolina. The length of the channel from its source to its mouth is 450 miles, but from the source to the mouth in direct line is only 250 miles. The area of the drainage basin is about 8,500 square miles. The current in the upper part of its course is rapid; considerable quantities of silt are brought down each year, and bars form in the broad portions of the stream where the current moves slowly. The tidal wave ascends to a point about 25 miles above Savannah. At Savannah the rise and fall of the tide is six and one-half feet. The river is navigable for small vessels to Augusta, 230 miles, and for large vessels as far as Savannah.

SAVANNAH (Ga.) **OPERATIONS AGAINST,** in the American Revolution. Since operations in the North had been barren of results, the British determined to renew the attack on the South, beginning the campaign at Savannah. Late in November 1778 Col. Archibald Campbell sailed from New York, landing three weeks later near the mouth of the Savannah River, and quickly dislodging a small force of Americans who attempted to dispute the British advance. Gen. Robert Howe (q.v.) with 800 American troops encamped between the landing place and the city, but a negro apprised Campbell of a by-path by which he could gain the rear of the American camp, and in the battle that followed the Americans found themselves between a cross-fire. Hence they retreated, leaving 100 of their number dead and wounded and about 400 in British possession. The Americans fled up the Savannah River and crossed into South Carolina, while the British occupied the city and remained in possession until the close of the war. Meanwhile, in November 1778, Comte d'Estaing (q.v.) had sailed with a French fleet to attack the British West Indies, after which, at the solicitation of the Americans, he went to Savannah, arriving 1 Sept. 1779 with 22 ships of the line and other smaller vessels. Gen. Benjamin Lincoln (q.v.) with 1,000 troops, reinforced by troops under Count Pulaski (q.v.), and Colonel McIntosh and a detachment of 3,000 French troops, lay siege to the city by land while d'Estaing carried on the naval operations. The city was defended by Gen. Augustine Prevost (q.v.) with about 2,500 troops. On 23 Sept. 1779 siege works were begun and on 1 October the various batteries opened the bombardment, which continued for several days without effect. Despairing of capturing the city by this method the allied forces decided to storm the British works. Accordingly, on 9 October, 4,500 French and Americans advanced in three columns, but were met with such a galling fire from the British batteries that, though successful in planting standards on the redoubts, they were repulsed with considerable loss. With 200 troops Pulaski endeavored to strike the garrison in flank, but he was killed and his troops dispersed. Unable longer to withstand the British fire, the attacking forces retired, the French having suffered a loss of 640 killed and wounded and the Americans 450. The British loss was comparatively small. On 18 October the siege was abandoned, the Americans recrossing the Savannah at Zubly's Ferry, and taking position in South Carolina, while the French embarked on their ships and sailed away. Consult Stedman, Charles, 'American War' (Vol. II, pp. 121–134); Lossing, 'Field-Book of the Revolution' (Vol. II); Lee, Charles, 'Memoirs of the War' (Vol. I, pp. 99–112); Carrington, H. B., 'Battles of the Revolution' (pp. 478–482); McCrady, Edward, 'South Carolina in the Revolution' (pp. 403–417); Mahan, Alfred T., 'The Influence of Sea Power upon History' (pp. 374–375); 'Georgia Historical Society Collections' (Vol. V, Pt. I); Moultrie, 'Memoirs' (Vol. II, p. 41); Ramsay, David, 'Revolution in South Carolina' (Vol. II); Wiley and Rines, 'The United States' (Vol. III pp. 159–171); Lowell, E. J., 'Hessians in the Revolution.'

SAVANNAH TO GOLDSBORO, Sherman's Campaign from (including the battles of Averasboro and Bentonville). Sherman's March to the Sea (q.v.) culminated in the capture of Savannah 21 Dec. 1864. It was a brilliant campaign, but of minor importance compared with that upon which he immediately prepared to enter. He says: "Were I to express my measure of the relative importance of the march to the sea, and of that from Savannah northward, I would place the former at one, and the latter at 10, or the maximum." Before the capture of Savannah, Sherman had received from General Grant a letter, dated 6 December, in which he had given his idea of Sherman's further movement, which was to establish a base on the sea-coast, fortify it, leave all artillery and cavalry, and enough infantry to protect them and threaten the interior, so that the militia of the South would have to be kept at home, and with the remainder of his command take transports for James River, join Grant before Richmond and participate in the destruction of Lee's army and the overthrow of the Confederacy. Sherman replied: "I had expected, after reaching Savannah, instantly to march to Columbia, S. C., thence to Raleigh, and then to report to you." After the surrender of Savannah, Grant (27 December) accepted Sherman's plan and instructed him to start on his expedition northward without further delay, break up the railroads in South Carolina

SAVANNAH, GEORGIA



A General View of the City

and North Carolina and join the armies operating against Richmond as soon as he could and by the route he deemed best. Sherman hastened his preparations; General Grover's division of the 19th corps was detached from the Army of the Shenandoah and ordered to Savannah as a garrison, and General Foster, commanding the Department of the South, was instructed to follow Sherman's inland movements by seizing in succession Charleston and other points on the coast, which might be abandoned. Ammunition, rations and clothing were accumulated, and 14 Jan. 1865 the 17th corps, General Blair, took transports at Savannah for Hilton, S. C., and moved to Beaufort, thence to Pocotaligo, on the Charleston and Savannah Railroad, thus threatening Charleston. Later the 15th corps, except Corse's division, joined the 17th. The left wing, 14th and 20th corps, under General Slocum, with Corse's division and Kilpatrick's cavalry, moved up the Savannah River, 40 miles, to Sister's Ferry, thus threatening Augusta. When Slocum arrived at Sister's Ferry the river had overflowed its banks and submerged the adjacent lowland, and there was a delay of some days before the waters had fallen sufficiently for a crossing. On 1 February, when the general movement began, the army was composed of two wings: the right wing, under Gen. O. O. Howard, consisted of the 15th corps, Gen. John A. Logan, and the 17th corps, Gen. F. P. Blair; the left wing, under Gen. H. W. Slocum, consisted of the 14th corps, Gen. J. C. Davis, and the 20th corps, Gen. A. S. Williams. The cavalry division, under General Kilpatrick, moved with the left wing, as also, at first, Corse's division of Logan's corps. The strength of the army 1 February was 53,923 infantry, 4,438 cavalry and 1,718 artillery, in all 60,079 men with 68 guns. There were about 600 ambulances, 2,500 wagons and provisions for 20 days, mostly of bread, sugar, coffee and salt. Beef cattle were driven and it was expected that a good supply of cattle, hogs and poultry would be gathered on the march. The disposition of the forces from Sister's Ferry on the left to Pocotaligo on the right menaced Augusta, Columbia and Charleston and left the Confederates in doubt as to the true point upon which Sherman was to move. The Confederates, under General Hardee, whose headquarters were at Charleston, and who had about 16,000 men, occupied the line of the Salkehatchie River, while Wheeler's cavalry operated on the heads and flanks of the advancing column. On 1 February the movement began. Howard's right wing marched from Pocotaligo for the Beaufort and Rivers' bridges of the Salkehatchie for the purpose of pushing on to the Edisto River, thus flanking Charleston. There was a sharp engagement (3 February) at Rivers' bridge, in which two divisions of Blair's corps waded breast deep through the swamp and carried the bridge with a loss of 88 killed and wounded, the Confederate loss being 52 killed and wounded. The Confederates, driven from the line of the Salkehatchie, retreated to Branchville, behind the Edisto, burning the bridges behind them. The left wing, under Slocum, marched through Barnwell, and on 10 February both wings were in the vicinity of Branchville on the Charleston and Augusta Railroad. Kilpatrick on the left went as far as Aiken and threatened Augusta. From Branchville the railroads in every direction were thoroughly destroyed, and the army started for Columbia, each of the four corps taking a separate road. Howard went by the Orangeburg road, and on the 16th his head of column approached Columbia, which was occupied by Gen. C. L. Stevenson's division of infantry, and Butler's and Wheeler's divisions of cavalry, in all about 5,000 men. Stevenson fell back to Winnsboro, leaving Wade Hampton, commanding the cavalry, to follow. On the 17th the 15th corps marched through the city and encamped beyond it on the Camden road. During the night the greater part of the city was accidentally burned. Slocum, advancing by Barnwell and Lexington, destroyed the Charleston and Augusta Railroad for several miles, and, after menacing Augusta, received orders to cross the Saluda River, at Mount Zion's Church, above Columbia. During the night a bridge was constructed and next day Slocum and Kilpatrick crossed, passed over Broad River and on the 21st arrived at Winnsboro, destroying on the way several miles of railroad north and south of Alston. Sherman, with the right wing, marched from Columbia, on the 20th, on the direct road to Winnsboro, and threatened Charlotte, N. C. He destroyed the railroad between Columbia and Winnsboro, and joined Slocum at the latter place. On the day that Sherman occupied Columbia, General Hardee evacuated Charleston, after destroying the public buildings, two iron-clad steamers, cotton and other property, and with about 14,000 men moved to Cheraw, on the Peedee River, and thence by a long march to Fayetteville, N. C. Next day Charleston was occupied by the Union troops of General Foster, who found 450 abandoned guns. The city had been fired, churches and private residences burned and everything presented a scene of desolation. Sherman, in his march, had made a clean swath of 40 miles, burning bridges, wrecking railroads and devouring nearly everything. Each family was left a reasonable amount of food, but all horses, mules and wagons were taken. From Winnsboro, Slocum destroyed the railroad as far north as Chester, threatened Charlotte, and then, forcing to the left the Confederates who were concentrating to dispute the march on Charlotte, the entire army turned eastward for Fayetteville, Slocum crossing the Catawba River at Rocky Mount and joining Howard, who had marched by roads farther south, at Cheraw (3 March), where were found 24 guns, 3,600 barrels of gunpowder and large supplies of stores, public and private, sent from Charleston for safe-keeping. Hardee made no opposition to the occupation of the place, and retreated to Fayetteville, leaving Wade Hampton's cavalry to cover his rear and burn the bridges behind them. On the 6th Sherman resumed his march on Fayetteville, by four different roads, and reached it on the 10th, Hardee again retreating without a show of defense, leaving Wade Hampton to skirmish with Sherman's advance and burn the bridge over the Cape Fear River. Kilpatrick, covering the movement on Sherman's left and rear, was surprised on the night of the 9th by Hampton's cavalry and pretty roughly handled, being driven from his camps and losing all his guns, which, however, he regained. He lost 183 men,

of whom 103 were captured. The march through South Carolina had been greatly delayed by almost incessant rains and the swampy nature of the country. Nearly all the way the army was compelled to corduroy the roads before the trains could be moved, in some instances the first corduroying was out of sight before the trains had all passed, and another road was laid over it. All this was done cheerfully by the men, working in icy water up to their knees. Before reaching Fayetteville it was heard that General Terry had taken Wilmington, and the day after the arrival of the army a Union steamer came up Cape Fear River, confirming the news and bringing mails and dispatches. Having thoroughly destroyed the arsenal buildings, foundries and machine-shops at Fayetteville, the army crossed Cape Fear River on the 13th and 14th for Goldsboro, the objective point of the campaign, where it was to unite with Generals Schofield and Terry, who were marching on that place from Newbern and Wilmington. It was now known that Gen. J. E. Johnston had been ordered to delayed Sherman's advance, and Sherman estimated that he had 37,000 men for the purpose. Apprehending that Johnston would seek an opportunity to strike him on the last stage of the march, Sherman ordered Slocum on the left to send his trains under a strong guard by an interior road on his right, and to keep at least four divisions with their artillery on the left well in hand, to meet an attack. Under this order Geary's and Baird's divisions were detailed to guard the trains. Slocum, preceded by Kilpatrick's cavalry, advanced on the direct road to Averasboro, to make a feint on Raleigh, and Kilpatrick was then to strike the railroad near Smithfield. Sherman says he "proposed to drive Hardee well beyond Averasboro and then turn to the right by Bentonville for Goldsboro." On the 15th Hardee was retiring from before Slocum, having for his rear-guard a brigade composed of artillery troops that had garrisoned Charleston, under command of Col. Alfred Rhett. During the evening Kilpatrick, in skirmishing with this rear-guard, near Taylor's Hole Creek, took some prisoners, among whom was Colonel Rhett.

Battle of Averasboro.— On the morning of the 16th opposition to the march was quite stubborn, and Kilpatrick, forcing back the Confederate rear-guard, came upon a line of intrenchments, on a narrow neck of swampy land, between Cape Fear and South rivers, and covering the road to Bentonville, along which Sherman intended that Slocum's wing should march to Goldsboro. Kilpatrick's cavalry was moved to the right and Jackson's and Ward's divisions of Williams' 20th corps were deployed in front of the Confederate line, and the two divisions of the 14th corps ordered up on Williams' left. Case's brigade was sent by Williams to the left to gain the flank and rear of the Confederate line, and succeeded in striking it in flank and sweeping it from position, capturing McBeth's Charleston battery of three guns and 217 of Rhett's artillery acting as infantry. Jackson's and Ward's divisions advanced and came upon the Confederates in another line of works about 400 yards in rear of the first. Kilpatrick was sent to the right to seize the Bentonville road, but his leading brigade was driven back by a furious attack of McLaws' division, upon which the Union infantry advanced directly against Hardee, who also was advancing, and drove him inside his works, and Slocum went into bivouac in his immediate front. During the night, which was stormy and very dark, Hardee retreated, leaving 108 dead and 68 wounded on the field. His entire loss, as estimated, was about 650, of whom 175 were captured. Slocum's loss was 77 killed and 477 wounded. Next morning Ward's division pursued Hardee a short distance beyond Averasboro and ascertained that he had retreated toward Smithfield.

Sherman was now under the delusion that no serious opposition would be made to his march on Goldsboro. "All signs," he says, "induced me to believe that the enemy would make no further opposition to our progress, and would not attempt to strike us in flank, while in motion." Under this impression his commanders were instructed to march their troops in the easiest manner and by the nearest roads to Goldsboro. The left wing marched from Averasboro on the direct road and on the night of the 18th, after driving back Hampton's cavalry to a position selected by Hampton for a battle, the 14th corps in advance, encamped 25 miles from Goldsboro and five from Bentonville, at a point where the road from Clinton to Smithfield crossed the one to Goldsboro. Two divisions of the 20th corps were camped 10 or 12 miles in rear, while Geary's and Baird's divisions were on other roads, with the trains still farther to the south. Howard's two corps were to the south and east, their advance at Lee's Store, more than a day's march distant. Sherman had been with Slocum and the left wing since the 14th and very early on the morning of the 19th started to join Howard, several miles to the east and south, to concentrate his forces and unite with Slocum at Goldsboro, where he expected to meet Schofield and Terry. He had no suspicion that General Johnston with a strong force was then in Slocum's immediate front, and supposed that the only opposition to be met would be from cavalry. When about to leave Slocum he expressed the opinion that Hardee had fallen back to Raleigh and that Slocum could reach Neuse River the next day, in which opinion Slocum concurred. But General Carlin, commanding a division of the 14th corps, and who was nearest the enemy, had observed matters that indicated a large force in front prepared for battle, and sought to impress his own convictions upon Sherman, who made light of them, said nothing but cavalry was in front and rode away to join Howard.

On 23 February Gen. J. E. Johnston had been assigned to the command of all the forces that could be collected to make head against Sherman. At this time Hardee was moving toward Fayetteville, N. C.; Beauregard was directing the march of C. L. Stevenson from Winnsboro to Charlotte; Cheatham, with his division of Hood's army, had come from Augusta, Ga., and was moving toward Charlotte, but on the west side of the Congaree and Broad rivers, and A. P. Stewart, with about 1,000 men of Hood's army, was marching for Charlotte. Johnston's first task was to concentrate these troops, which was done at Smithfield, N. C., where he was joined by Hoke's division from Lee's army at Richmond, which had unsuccessfully engaged General Cox, near Goldsboro (see KINSTON, BATTLE OF), and also by S. D. Lee, with about 3,000 men of Hood's army. In all Johnston had about 20,000 men. He had as subordinate commanders Generals Bragg, Hardee, A. P. Stewart, S. D. Lee, Wade Hampton and others of high rank, who had long been the pride and ornaments of the Confederate armies.

Battle of Bentonville.— On the 17th General Johnston had become satisfied that Sherman was not marching on Raleigh. He heard on the morning of the 18th that Sherman was marching on Goldsboro, and was informed by Wade Hampton that the 14th corps was in his immediate front, that the 20th corps was several miles in rear on the same road, while Howard's two corps were on roads some miles to the south, and he determined to crush the 14th corps before the 20th could come to its support, and then fall upon the 20th. He ordered Hampton to hold Slocum's head of column in check until he could march from Smithfield, 16 miles distant, and join him to give battle on ground that Hampton had selected, and to which he was forced back that evening, which was at a point about three miles south of Bentonville. In order to attack the head of Slocum's column early next morning, Johnston immediately marched his army from Smithfield, intending to bivouac that night between Bentonville and the road on which Slocum was moving. But the distance was greater than expected, the roads bad, and but a small part of the column reached Bentonville that night, the main column bivouacking some distance in the rear. As soon as Hardee's troops reached Bentonville next morning they were marched by the left flank, Hoke's division leading, to the ground selected by Hampton, on the eastern edge of an old plantation, extending one and one-half miles to the west, lying principally on the north side of the road, and surrounded east, south and north, by dense thickets of black-jack. As there was but one narrow road through the thicket, the deployment of the troops consumed a weary time. Hoke's division was formed with its centre on the road, its line at right angles to it, on the eastern edge of the plantation, and its left extending some 400 yards into the thicket to the south. Two batteries, the only artillery, were on his right, commanding the ground in front to the extent of the range of the guns. The troops belonging to the Army of Tennessee were formed on the right of the artillery, their right strongly thrown forward, conforming to the edge of the open ground. Meanwhile, and before these dispositions had been completed, the battle had opened. Very early in the morning Hampton had thrown forward his cavalry, and when Carlin's division of the 14th corps began its march at 6 o'clock it became almost immediately engaged with the Confederate cavalry, which offered such a stubborn resistance that Carlin deployed his entire division and brought up his artillery, and one brigade was sent to the left to develop the Confederate line, and as the resistance increased Morgan's division was moved to Carlin's right as a support, and the entire line was ordered to go forward, and was soon severely engaged, convincing Slocum that he had something more than cavalry in his front, of which fact he was soon further convinced by a deserter from the Confederates, who informed him that Johnston was in his immediate front, and that the talk in the Confederate camp was that Slocum was to be crushed.

Slocum prepared for defense by throwing up works, ordered Williams, commanding the 20th corps, to throw his train to the right and hasten up, and sent a messenger to Sherman with the information that Johnston's army was in his front. Carlin's division in advancing struck Hoke's division and after some severe fighting was repulsed, upon which Johnston ordered Hardee to charge with the right wing, Stewart's Army of Tennessee troops and Taliaferro's division, and General Bragg to join in the movement with his brigades successively, from right to left, each making the necessary change of front to the left in advancing. Hardee led his men forward and drove Carlin back just as the advance of the 20th corps came up, one brigade of which was sent to Carlin's support, and was driven back with him, and another put in the gap between Carlin and Morgan just as the Confederates reached the line, the remainder of the corps forming on Carlin's left. The Confederates had become somewhat broken up in advancing through the woods, and when they received a telling fire from behind the slight entrenchments that had hurriedly been thrown up they fell back. On the right Morgan's division of the 14th corps, with its supports, held its ground against Bragg's persistent attacks. The Confederate assaults were repeated several times until a late hour, each assault finding the Union line better prepared to receive it. Johnston had given the 14th corps a heavy blow, but had failed to crush it, and determined not to renew the attack, but only to hold the ground until his wounded could be removed. The battle of the 19th was fought by about 16,000 men of the 14th and 20th corps on one side and about the same number of Confederates on the other.

When Capt. Joseph B. Foraker delivered to Sherman the message from Slocum that he had run up against Johnston's whole army, Sherman was incredulous, but he sent word to Slocum to hold on, ordered the 15th corps, which was well to the rear, to turn at once toward Bentonville, and the 17th corps to move in the same direction. Hazen's division of the 15th corps reported to Slocum during the night and was placed on the right. Early in the morning of the 20th Geary and Baird, each with two brigades, arrived on the field. Baird was placed in front of the works and moved out beyond the advanced position held on the preceding day. The day was spent in strengthening the position and developing the line of the enemy, which brought on sharp skirmishing. The right wing under Howard came up late in the afternoon of the 20th and on the morning of the 21st. It had marched 20 miles over bad roads, skirmishing a great part of the way with the Confederate cavalry. There was heavy skirmishing during the day, but no general attack, and during the night Johnston retreated, crossing Mill Creek by the bridge at Bentonville and bivouacking on the night of the 22d near Smithfield. The Union loss in the battle was 191 killed, 1,168 wounded and 287 missing,

an aggregate of 1,643. The Confederate loss was 239 killed, 1,694 wounded and 673 missing, an aggregate of 2,606.

On the 22d Sherman resumed his march on Goldsboro and on the 23d and 24th his entire army was assembled around the place and junction made with Schofield's and Terry's forces, which had occupied it two days before. (See GOLDSBORO, KINSTON, etc.). "Thus," writes Sherman, "was concluded one of the longest and most important marches ever made by an organized army in a civilized country. . . . The country generally was in a state of nature, with innumerable swamps, with simply mud roads, nearly every mile of which had to be corduroyed. In our route we had captured Columbia, Cheraw and Fayetteville, important cities and depots of supplies, had compelled the evacuation of Charleston City and Harbor, had utterly broken up all the railroads of South Carolina and had consumed a vast amount of food and forage, essential to the enemy for the support of his own armies. We had in mid-winter accomplished the whole journey of 425 miles in 50 days, . . . and had reached Goldsboro with the army in superb order and the trains almost as fresh as when we had started from Atlanta." Consult 'Official Records' (Vol. XLVII); Van Horne, 'History of the Army of the Cumberland' (Vol. II); Sherman, 'Memoirs' (Vol. II); Johnston, 'Narrative'; The Century Company's 'Battles and Leaders of the Civil War' (Vol. IV).

SAVARY, sä-vä-rē, **Anne-Jean-Marie-René,** DUKE OF ROVIGO, French general: b. Marcq, department of Ardennes, 26 April 1774; d. Paris, 2 June 1833. In 1789 he entered an infantry regiment. He served under Custine, Moreau and Desaix, and accompanied the last named on the expedition to Egypt. After the battle of Marengo he was appointed adjutant to Bonaparte, and soon rose very high in his confidence. After rising to the rank of lieutenant-general he was rewarded, after the victory of Friedland, with the title of Duke of Rovigo. In 1808 the emperor sent him to Madrid, where he negotiated the arrangement by which the Spanish king and his son were kidnapped. In 1810 he succeeded Fouché as minister of police. On Bonaparte's return from Elba he gave in his adhesion to him, and was appointed inspector-general of gensdarmes. He was carried to Malta in 1815, but escaped after being a prisoner for seven months. While there he began his 'Memoirs.' Later he stood trial at Paris as one who had contributed to Napoleon's return, but was acquitted. In 1831–33 he was military commander of Algiers.

SAVASTANA. See GRASSES IN THE UNITED STATES.

SAVE, sāv, or **SAU,** sow, Jugo-Slavia, river tributary to the Danube, formed near Radmannsdorf from the waters of the Wurzen and Wochlein Save which have their source in the eastern slope of the Julian Alps, and flow southeast through Illyria, along the southern part of Styria into Croatia. At the frontier it becomes exceedingly tortuous, and finally flows through the Wocheiner See. The fall is rapid until the Leibach is received, and then the river becomes navigable, flowing through a narrow valley enclosed by mountains; it follows a circuitous route for about 540 miles and joins the Danube at Belgrade. Its main tributaries are all on the right — the Kulpa, Una, Vrbas, Bosna and Drina. In the lower part, forming the boundary between Austria and Servia, it flows through flat plains, often devastating them by inundation. It forms an important outlet for the produce of the districts through which it flows.

SAVERY, Thomas, English engineer: b. Shilstone, near Modbury, Devonshire, about 1650; d. London, May 1715. He became a military engineer and rose to be captain in 1702. He is known for his inventions, most important of which was a machine for raising water from mines, which was the first practical application of steam power to a mechanical purpose. A patent granted him in 1698 extended until 1733.

SAVIDGE, Eugene Coleman, American physician and author: b. Maryland, 21 Oct. 1863. He was graduated from the University of France in 1888; from that of New York in 1889. He was for a time editor of the *Expressman* and is now attending gynecologist at Saint Mark's Hospital, New York. He has written 'Wallingford' (1882); 'Life and Times of Brewster' (1891); 'The American in Paris' (1895); 'Selective Involution'; 'Philosophy of Radio-Activity' (1914); 'The Problem of Cancer'; 'Unclassified Dreams' (1915).

SAVIGNY, sä-vēn-yē, **Friedrich Karl von,** German jurist; b. Frankfort-on-the Main, 21 Feb. 1779; d. Berlin, 25 Oct. 1861. He studied chiefly at Marburg, became a lecturer there in 1800, and in 1803 professor of jurisprudence. In 1808 he was made professor of law in the University of Landshut, in Bavaria, and in 1810 obtained the chair of jurisprudence in the newly established University of Berlin, where he continued to lecture with uninterrupted success for 32 years. He was elected a member of the Prussian Academy of Science in 1811, was appointed a councilor of state in 1817 and in 1842 Minister of Justice for the revision of the law. He retired in 1848. His principal works are 'Geschichte des römischen Rechts im Mittelalter' (1815–31); 'System des heutigen römischen Rechts' (1840–48), to which 'Das Obligationenrecht' (1851–53) forms an appendix; 'Vermischte Schriften' (1850), a collection of essays which had appeared in legal periodicals. He brilliantly applied the historical method to the exposition of the Roman law. Consult the biographies by Bethmann-Hollweg (1867) and Enneccerus (1879).

SAVILE, săv'il, or **SAVILLE, George,** MARQUIS OF HALIFAX, English statesman and writer: b. Thornhill, Yorkshire, 11 Nov. 1633; d. London, 5 April 1695. On the death of Cromwell he distinguished himself by his exertions in behalf of Charles II. In 1669 he was appointed a commissioner of trade, in 1672 became a member of the Privy Council, and in 1682 was created Marquis of Halifax and lord privy seal. Under James II he was made president of the council, but was dismissed from office because he opposed the repeal of the Test and Habeas Corpus Acts. From this time Lord Halifax continued in opposition, and contributed to the elevation of William III to the throne. He was the author of 'Advice to a Daughter' (1868), and of a variety of political tracts, the principal of which are 'Maxims of State'; 'The Character of a Trimmer'; 'Character of King Charles II'; 'Anatomy of an Equivalent'; 'Letter to a Dissenter.'

SAVILE, Sir Henry, English scholar: b. Bradley, near Halifax, Yorkshire, 30 Nov. 1549; d. Eton, 19 Feb. 1622. He was educated at Oxford, became tutor in Greek to Queen Elizabeth, and in 1585 was made warden of Merton College and provost of Eton in 1596. He was knighted in 1604. In 1619 he founded two professorships in geometry and astronomy at Oxford, besides conferring several other valuable benefactions, both in property and books. Among his works the principal are his 'Commentaries on Roman Warfare' (1591); 'Rerum Anglicarum post Bedam Scriptores' (1596); 'Prælectiones tresdecim in principium elementorum Euclidis' (1621); and his edition of the writings of Saint Chrysostom (1610–13), in eight folio volumes, a work on which he is said to have spent £8,000.

SAVILLE, Marshall Howard, American archæologist: b. Rockport, Mass., 24 June 1867. He studied anthropology as a special student at Harvard University in 1889–94, and afterward engaged in field work under Prof. F. W. Putnam. He conducted a series of investigations of the remains of the Ohio Mound Builders, making some notable discoveries. He also made important explorations in Yucatan in 1890; in Honduras in 1891–92, 1915; in Mexico in 1899, 1902–04; in Ecuador in 1906–10, 1913; in Colombia in 1914; and in Central America in 1917. He was assistant curator at the American Museum of Natural History in 1894–1902; and in 1902–05 curator of anthropology and Mexican and Central American anthropology there. Since 1903 he has been professor of American archæology at Columbia University. He is author of numerous monographs on anthropology and archæology.

SAVIN, or **SABIN.** See JUNIPER.

SAVINGS BANK. See BANKS AND BANKING.

SAVIOUR, Order of the. See BRIGITTINES; ORDERS, RELIGIOUS.

SAVONA, sä-vō'nä, Italy, in the province of Genoa on the west coast of the Riviera, 26 miles southwest of Genoa, is one of the most important towns of that region. It is picturesquely situated amid vine-clad hills and orange groves. The Castle of Saint George (1542) is now a military prison; the other buildings deserving notice are a Renaissance cathedral, with the magnificent tomb erected by Sixtus IV to his parents; the Della Rovere Palace, now occupied by municipal officers; other churches, a lyceum, a technical and a commercial institute, other educational institutions, a fine theatre, and a large hospital. It is a centre of the iron industry, having foundries of all kinds, besides glass-works, potteries, tanneries, brickyards and sulphur mills. It is an important seaport. Its chief imports are coal, petroleum, iron, cereals, and the exports consist of tomatoes, wood and candied fruits. The harbor, which is good, is defended by a fort. Pop. 50,000.

SAVONAROLA, Girolamo, jē-rō'lä-mō sä-vō-nä-rō'lä, Italian religious reformer: b. Ferrara, Italy, 21 Sept. 1452; d. Florence, 23 May 1498. As a boy he was well acquainted with mediæval learning and his family intended that he should become a physician, but a disappointment in love turned his thoughts to the church, and in 1475 he left home secretly and joined the Dominican order. After passing a severe novitiate in the monastery at Bologna he was made a teacher there, and in 1482 was sent to Saint Mark's monastery in Florence where he became disgusted at the corruption in church and state, and began to attack the abuses in his sermons. His first success as a preacher was at Brescia in 1484–85. He fascinated the worldly Italians by his terrible denunciations of vice and wickedness, and returned to Florence with a reputation as a popular preacher. In 1490 he was made *lector* in Saint Mark's, and crowds came to hear him. A year later he was chosen prior of Saint Mark. Though his convent had been favored by Lorenzo di Medici, Savonarola refused to do homage to him, as was customary. Lorenzo tried in vain to conciliate the friar who continually preached against the abuses in state and church. In 1492, Lorenzo di Medici, the chief opponent to the work of Savonarola in Florence, died. In the political confusion that followed, and during the invasion of Italy by Charles VIII of France, Savonarola by his public services acquired great influence among the Florentines. He desired a democratic government for Florence, and, when in 1494 the people drove out the Medici, he opposed the schemes of the aristocracy to seize the government, called a mass-meeting of the citizens and practically assumed the dictatorship of Florence, superintending the formation of a government in which the people were to fear God and amend their conduct, and prefer public to private interests. A general amnesty was proclaimed, and a council modeled on that of Venice was chosen to administer the government. There was no doge as in Venice, but for three years Savonarola was dictator. His enthusiasm for liberty, his zeal in religion, and his eloquent sermons, caused light-hearted pleasure-loving Florence to become a city of Puritans. Thomas Aquinas and the Old Testament furnished the spirit of the laws. Though not of the Renaissance and hostile to its spirit, especially to the pagan influence derived from the classics, Savonarola was not an enemy to learning and fine arts, though in 1497 he encouraged committees of children and devotees to search the city for frivolous books, cards, profane songs and music, and works of art of evil tendencies, which were destroyed under the direction of the government. No good books or works of art were destroyed at this time, though the next year many were lost in a second "burning of the vanities." Savonarola aimed at reforming the Church in the same caustic way. With his moral reforms he closely knitted political schemes and doctrines, and several times preached vigorously against Pope Alexander VI, who first tried to conciliate him. Savonarola spurned his advances, and in 1496 was ordered to cease preaching, and to undergo a trial for heresy. Silent for a time, Savonarola was attacked by the Franciscans and began again to preach. In 1497 he was excommunicated and Florence was threatened with an interdict if she harbored him. For a year he defied excommunication and demanded that a general council be called to depose Pope Alexander. But he had presumed too much upon the support of fickle citizens. Many were weary of

the Puritan rule and longed again for the flesh pots of Egypt; the other cities of Italy were hostile to Florence because of her course during the French invasion and because of her democratic government; there had been famine and pestilence, which Savonarola had been unable to alleviate; some of the followers of the Medici had been executed and thus powerful enemies made; and now Florence was threatened with an interdict. Savonarola had to be guarded by armed followers when he went to preach. In 1498, while still powerful, he in a sermon had called upon Heaven to consume him with fire if he had acted from unchristian motives. A friar of the Franciscan order thereupon offered to pass through the ordeal of fire with Savonalora, who treated the offer with contempt. But the Dominicans volunteered to undergo the ordeal to show their faith in Savonarola, and after hesitation, which his enemies made the most of, Savonarola consented to the judgment by ordeal, believing in Divine intervention in his favor. The fires were made ready and the opposing champions seemed ready to enter the flames, when the Franciscans, who had no intention of carrying out the judgment by ordeal, began to raise disputes to cause delay. They insisted that the Dominicans must not bear the crucifix nor the host through the flames. Savonarola would not agree to give up the latter and the dispute lasted until a rain came and gave the Franciscans an opportunity to slink away. But upon Savonarola was blamed the failure of the ordeal. The populace was infuriated because they had missed the show, and called Savonarola an impostor who was afraid of the ordeal. Florence turned against him; he was arrested, accused of heresy and after six days' torture and a hasty and unfair trial, was condemned to be hanged and then burned. The sentence was carried out with all the refinements of cruelty. Savonarola was a powerful, typical mediævalist, hostile to many of the manifestations of the Renaissance spirit. His talent for political organization was profound, but he was mistaken in thinking the Florentines capable of self-control in politics or of puritanism in religion. The Italian despots understood the people better than Savonarola, and only as a despotic leader was Savonarola himself to any degree successful. His ideals were those of an ascetic, uncompromising, rigid. An eloquent speaker, he, for a time, imposed his ideals upon the Florentines, who when weary of being good, left him to his enemies. Of a mystical turn of mind, he attached great importance to dreams and visions which he related in his sermons. The writings of Savonarola were voluminous, embracing sermons, essays and poems on religious subjects, and a treatise on the government of Florence.

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SAVONNERI TAPESTRY. See TAPESTRIES.

SAVOU, sä-voo', **SAVOE,** or **SABOE,** an island of the Asiatic Archipelago in the Indian Ocean, near the islands of Timor and Sandalwood. It covers an area of 237 square miles. The surface is elevated in the centre, sloping seaward. It is well-watered and fertile, yielding millet, corn, beans; tropical products as usual in this latitude, including betel, cinnamon, mangoes, cotton, tobacco, etc. Domestic animals are numerous, besides buffalo, wild boars and deer. Horses and tobacco are the chief exports, sent to Timor. The island consists of five principalities, subject to the Dutch government of Timor. The inhabitants are Malays — a strong race with pagan practices, including dog sacrifices. Pop. 16,000.

SAVOY, House of. The territory of Savoy formed part of ancient Gaul, and from 122 B.C. to 407 A.D. was in possession of the Romans, by whom it was divided into two provinces, the Graian and Pennine Alps. At the latter date it was seized by the Burgundians, but with Burgundy it became subject to the Franks in 534, was included in the Carlovingian empire, and on its dissolution in 887 was granted by the Diet of Tribur to Rudolph, king of Transjurane Burgundy, and with that kingdom was united to Cisjuran Burgundy or Arles. On the accession of the last king of Arles to the imperial throne as Conrad II in 1027, the more powerful nobles of northwestern Italy, such as the Marquis of Susa, the Counts of Maurienne, Turin and Chablais, became vassals direct of the emperor. Umberto Blancamano, Count of Maurienne, was the first of the family who took a prominent place among the princes of northern Italy. His nephew, Amadeus II (1060–80), in right of his mother, Adelaide, heiress to the Marquisate of Susa, added nearly the whole of Piedmont to the original possessions of his house. Humbert II, his son and successor (1080–1103), further increased his dominions by the conquest of Tarantasia. Amadeus III (1103–49) received from the Emperor Henry V the title of Count of Savoy in 1111; and his grandson, Thomas I (1188–1233), who supported Frederick II in his contest with the popes, obtained important accessions in Chambéry, Turin, Vaud and other lordships. Amadeus IV (1233–53), like his father a warm adherent of the emperor, obtained the submission of the city of Turin to his rule, and ceded Piedmont to one of his brothers, Thomas, Count of Maurienne. He was succeeded by Boniface (1253–63), and Boniface by his uncle, Peter (1263–68), who reconquered Turin, which had rebelled. His nephew, Amadeus V (1285–1323), now mounted the throne; he assisted Philip the Fair in his war against Flanders, and accompanied the Emperor Henry VII to Italy. His grandson Amadeus VI aided the Greek emperor, John Palæologus, against the Turks and the Bulgarians and accompanied the pretender Louis of Anjou, in his expedition to Naples. His son, Amadeus VII (1383–91), forced the Count of Provence to cede to him Nice and Vintimiglia. Amadeus VIII, grandson of the preceding (1391-1451), received the ducal title from the Emperor Sigismund in 1416, acquired the county of Geneva, together with Bugey and Vercelli, and re-annexed Piedmont. Louis, who on the abdication of his father had governed as regent, assumed the title of duke in 1440. The elder male line becoming extinct in 1496, the crown devolved on the nearest collateral heirs, Philibert II (1496–1504), and his brother Charles III (1504–53). The latter aided the Emperor Charles V against Francis I of France, and after losing Valais and Geneva, which joined the Swiss Confederation in 1533, and the canton of Vaud, seized by the Bernese in 1536, he was finally deprived of all his territories by the French king. But his son Philibert Emmanuel, surnamed the Iron Head (1553–80), commander-in-chief of the Spanish army, succeeded in gaining back the greater part of the paternal domains by the treaties of Câteau-Cambrésis (1559) and Lausanne (1564). In 1560 he was induced by the courts of Rome, Spain and France to attempt the conversion of the Waldenses by force, but they offered such vigorous resistance to his troops in several encounters that he granted them, under certain conditions, the free exercise of their religion (5 June 1561). Charles Emmanuel I (1580–1630) was defeated by Henry IV of France, who invaded Savoy and Piedmont. His son Victor Amadeus I speedily regained the possessions his father had lost, and added to them Montferrat, Alba, and some other places, surrendering to France in exchange Pignerol, La Perouse, Angrone and Lucerne. His younger brother Thomas was the founder of the line of Savoy-Carignan. Victor Amadeus II (1675–1730), grandson of the first of that name, at the beginning of the war of the Spanish Succession, sided with France; but bribed by brilliant offers, allied himself to Austria by the Treaty of Turin, 25 Oct. 1703. The victories of the Duke of Vendôme compelled him to retire to Genoa, but the defeat of the French under the walls of Turin by Prince Eugene (7 Sept. 1706) restored his possessions. In 1709 he severed the Austrian alliance, and remained neutral until the end of the war. By the Treaty of Utrecht (1713) he received a part of the duchy of Milan, with the island of Sicily, which conferred upon him the title of king. In 1720 he was compelled to give up Sicily to Austria in exchange for Sardinia, which with Savoy, Piedmont and his other continental dominions, were erected into the kingdom of Sardinia. Consult Wiel, 'The Romance of the House of Savoy' (1901).

SAVOY, Military Order of. See ORDERS, ROYAL.

SAVOY, or **SAVOIE,** sä-vwä, France, consists of two eastern departments, Savoie and Haute-Savoie, formed in 1860 out of the former duchy of Savoy, one of the states of the Sardinian monarchy (q.v.); it covers an area of 4,162 square miles (2,368 in Savoie and 1,774 in Haute-Savoie), and is exceedingly mountainous. The region is separated from Switzerland by Lake Geneva and is dominated by Mont Blanc, the loftiest peak of the Alpine chain, whose many ramifications extending in all directions present a relief of successive mountains and valleys. Savoy belongs to the Rhone basin, which forms its western boundary. The other rivers are the Arve, Isère and Arc. The chief lakes besides Geneva are those of Bourget and Annecy. The climate is, generally speaking, cold. Savoy is rich in mineral waters, of which the most famous are those of Aix-les-Bains (hot-sulphur), Marlioz, Challes (strong natural sulphur), Salins-Montiers (hot, saline, various minerals), Brides-les-Bains (soda, calcium). The extent of arable ground is limited, but a scarcity of grain is supplied by the chestnut which forms a staple food among the peasants and the poor. The vine is somewhat cultivated in the lower valleys and slopes. The main source of profit is in the cattle and dairy produce, as hay and pasture alone are obtained from much of the land. The forests, which cover vast mountain slopes, also afford a rich supply of timber. The minerals are not sufficiently exploited to be of any importance. The manufactures are coarse woolens, linen and cotton goods, felt hats, leather and hardware. Other industries are silk, tanning and weaving. There is an important transit trade carried on between France and Italy, by way of Mont Cenis. Coal, skins, cotton, provisions are imported; cattle, dairy produce, wood, stones, mineral waters, silk goods, tanned leather and paper are exported. There are some schools, all speak French and they are exclusively Roman Catholic. The University Academy is at Chambéry, and clock-making is taught in two special schools at Annecy, employing 2,000 hands. (Here is also a large cotton mill). The inhabitants are industrious, honest, hospitable and intelligent; their chief characteristic, however, is love of country. Though often compelled to leave their homes for winter employment, wandering through France, Switzerland, Spain, or Italy, in order to earn a livelihood, they return to their native mountains at the earliest moment. Sardinia ceded Savoy to France in 1860. It was formed into the two departments of Savoie and Haute-Savoie, whose capitals are respectively, Chambéry and Annecy. Pop. Haute-Savoie 255,137; of Savoie about 248,890; total, 503,027.

SAVOY CABBAGE, a variety of cabbage (q.v.) with many sub-varieties, forming large close heads with wrinkled leaves, and cultivated for winter use, requiring a light, rich soil.

SAVOY CONFERENCE, a conference held in 1661 at the Savoy Palace, London, between a number of Church of England and Presbyterian divines for the purpose of "advising upon and reviewing the Book of Common Prayer; and of taking into serious consideration the several directions and rules, forms of prayer, and things in the same book;

of consulting also upon the several objections which shall now be raised against the same; and, if occasion need be, to make such necessary and reasonable alterations, corrections and amendments as shall be agreed upon to be needful and expedient for the giving satisfaction to tender consciences, and the restoring and continuing of peace and unity in the churches under his majesty's government and protection." When the Parliamentary cause triumphed in the civil war of 1642–46 the majority of the clergy, who were royalists, were either turned out of their pulpits and their places were filled by Presbyterians, then a strong body in England; and at the Restoration of Charles II a large number of the ministers connected with the church strongly objected to Episcopalian order and practice being again introduced. The government was fully aware of this state of matters, and it was accordingly resolved that the determination of all matters appertaining to the establishment of unity should be left to the advice of a national synod. On 25 March 1661, therefore, the letters-patent above quoted from were issued, appointing 12 bishops, with nine clergymen as assistants on the Episcopal side, to meet with an equal number of Presbyterian divines and discuss the matters therein mentioned. The commissioners met for the first time on 13th April. Sheldon opened the discussion by observing that the Episcopal party, being perfectly satisfied with the established forms of worship, had nothing to propose, and would therefore expect that any objections to the existing order of things, and any innovations that might be desired, should be mentioned by their opponents. The Presbyterians moved that Bishop Ussher's Reduction of Episcopacy, a scheme in which the elements of the Scotch system of presbyteries, synods and general assemblies were combined with distinctions of ecclesiastical ranks, should be laid down as a ground-work to treat upon. They further offered several exceptions to the liturgy, against the many responses of the people, and desired that all might be made one continued prayer. They objected to lessons being taken out of the Apocrypha, and wished that the psalms used in the daily service should be according to the new translation. They excepted to many parts of the baptismal service that infer the doctrine of the regeneration of the baptized. They also moved that the practice of kneeling at the Lord's Supper, and that the use of the surplice, the cross in baptism, of godfathers as sponsors, and the celebration of the holy days, should be abolished. It was urged in reply to the demand for the adoption of Ussher's scheme, that the king's commission gave them no power even to take into consideration any questions relating to the government of the church; and the Presbyterians proceeded to discuss the minor points, mainly the alterations in the liturgy. Baxter undertook the preparation of what was called a Reformed Liturgy, but the Episcopalian commissioners rejected it at once, without examining it. The two parties finally separated at the end of four months, the period assigned by the letters-patent, without coming to a single resolution, and the government passed in the following year the famous act of uniformity, the stringent clauses of which drove about 2,000 clergymen from the Anglican Church.

SAVOY DECLARATION, the document uttered by the Independents and Presbyterians who met at the Savoy Hospital in London 29 Sept. 1658. In it these religionists declared the principles of their faith and polity. The Declaration is substantially the same as the Westminster Confession. See CONFESSION OF FAITH, WESTMINSTER.

SAVORY, aromatic herbaceous or half-shrubby plants of the labiate genus *Satureia,* native to the Mediterranean region and the Levant. They are cultivated in kitchen gardens. Summer savory (*S. hortensis*) is an annual with slender branching stems nearly a foot high, bearing soft, lanceolate leaves, often stained with purple, and with lilac or white mint-like flowers in the axils. The young shoots are plucked at flowering time, and dried for flavoring dressings, etc. Winter savory (*S. montana*) is a perennial species, with similar qualities.

SAW-FISH, a ray of the family *Pristidæ,* so called from the sword-like snout, the sides of which are armed with spines, so as to give it the appearance of a large doubled-toothed saw. Armed with this formidable weapon, which may measure two or three feet or more in length, the saw-fish is said to attack even whales, and to inflict severe injuries upon them, while it is certainly destructive to shoals of small fishes upon which the saw-fish subsists. The true teeth of the mouth are small, blunt, and arranged pavement-like. The mouth is situated on the under surface of the head, and the breathing apertures are large and set behind the eyes. The fins, tail and granular scales are shark-like in most respects. About five species are known, all inhabitants of the open ocean, whence they seldom approach the shore; and they perfer warm waters. A common species on the Gulf Coast of the United States is *Pristis pectinatus,* which sometimes enters the lower Mississippi or wanders northward on the Atlantic Coast; it is 10 to 20 feet long. The *Pristisphoridæ,* which bears a similar weapon, are sharks.

SAW-FLIES, insects of the family *Tenthredinidæ,* so called because the ovipositors are constructed of parallel, toothed blades with which the females cut holes in vegetable tissue to receive their eggs. Unlike the wasps, bees, ants and other members of the order *Hymenoptera,* the abdomen is united by its full girth to the thorax; that is, it is sessile. In general they resemble other members of the order in having two pairs of transparent wings with rather few veins and cells, biting mouth-parts, and a complete metamorphosis. The larvæ resemble caterpillars, but have at least six pairs of prolegs instead of five as do the larvæ of lepidopterous insects. They are also frequently slimy, and often they keep part of their bodies curved beneath the edge of the leaf upon which they are feeding. All feed upon living vegetable tissue, and some are troublesome upon cultivated plants. The currant-worm or slug (*Pteronus ribesii*), a yellow bodied European insect, whose black-dotted green larvæ appear shortly after the leaves in spring, eat gluttonously for about three weeks and transform to adults below the ground. Two or three broods may appear in a season. The pear slug (*Eriocampoides lamacina*) is a slimy larva which sometimes

damages pear foliage. Rose slug, grape slug, raspberry slug, turnip fly and willow saw-fly are other well known species which occasionally do damage. In such cases they have been combated with an insecticide (q.v.) which must be eaten, though in some cases dust, forcible spraying with water, and other remedies have been reported effective.

SAW-MILL, a complete sawing machine, with all its adjuncts, for converting logs into planks, boards and slabs. The earliest form was the sawpit with raised trestle horses upon which the log was raised and then sawed by hand saws or by whip saws. Windmill power was applied about the beginning of the 13th century and was soon followed by water power.

All attempts to establish saw-mills in England during the period of 1660–1770 were unsuccessful on account of the opposition of the hand sawyers; but in the United States, beginning with the erection of the mill at Piscataqua Falls in the State of Maine in 1634 a vast number of mills have been built in all of the wooded districts of the country and by the development of improved methods in handling the logs, and in arranging the machinery, have made such States as Maine, Michigan and Wisconsin famous as lumber producing areas.

Of these mills the earlier forms are known as gate or sash saw-mills and consisted of two upright guide posts held in position by a transverse beam at the top. A heavy rectangular wooden frame carrying a straight band saw attached to the top and bottom pieces, worked with a vertical reciprocating motion in slides between the guide posts. The reciprocating motion was imparted to the sliding frame by a connecting rod, the lever end of which extended to one end of a water-wheel shaft. The carriage bearing the log was moved by a rack and pinion arrangement operated by a feed-wheel and the log was fed endwise to the saw, which was run, usually, at a speed of 150 strokes per minute and was capable of producing from 500 to 2,000 superficial feet of lumber per day of 10 hours.

A larger output was obtained by introducing the "gang" feature, which consisted of attaching several saws to the sliding frame. In the "Yankee gang," the saws were arranged in two sets, with the tooth edges of one set facing in a direction opposite to that of the other set, and enabled the sawing of two logs at one movement of the carriage. Other forms, designated "slabbing gang," "stock gang" and "pony gang," applied the method to special purposes.

The "muley" saw followed the gate and gang saws and was adopted generally by the smaller mills on account of the great reduction in the weight of the reciprocating parts. In this arrangement, the ends of the saw are attached to two light cross-heads opposite each other, which oscillate up and down. The saw is kept in line by means of slides working in a strong iron frame swung from an overhead beam. The cutting is accomplished entirely by the downward motion, during which the action of the slides causes the saw-teeth to hug close to the wood and then recede from it during the upward motion, so as to reduce the friction. Muley saws are driven at a speed of about 300 revolutions of the driving wheel per minute and are capable of turning out about 6,000 superficial feet per day.

Saw-mills employing circular saws are of comparatively recent date. The experimental point in the use of the circular saw as the main saw of a mill was passed about the middle of the 19th century, since which time it has been developed to a state of very high efficiency and general usefulness. By its use a continuous cutting motion is obtained and driven by engines ranging from 25 to 100 horse power circular saws in connection with steam feeding arrangements are capable of sawing from 20,000 to 100,000 superficial feet per day, practically limited only by the capacity of the handlers to remove the lumber.

The saw, which is a disc of steel with a toothed edge, is mounted on a shaft which is rotated by gear wheels, or by belts operated by the shaft of a water wheel, steam engine, etc. The cutting depth of the saw is somewhat less than half the diameter of the disc and the saws generally employed rarely exceed a maximum diameter of six feet on account of the increased thickness required to obtain rigidity, and the consequent increase in the amount of the kerf or cut waste. Water power was used almost exclusively until 1835, but it has been almost completely supplanted by steam engines. "Band saws," although known a great many years before the circular saw, were not adopted until recent years on account of the difficulty experienced in making saws of sufficient endurance to withstand the severe service. During recent years, however, these difficulties have been overcome and they are now generally used in all of the great lumber producing countries.

The mechanical arrangement consists of two broad-faced wheels mounted one above the other. Over these wheels, a continuous band of steel, which is the saw, works like a belt over two pulley wheels, with a continuous motion, and the logs are fed endwise against the cutting or toothed edge by a traveling carriage. Mills employing band saws are capable of producing from 40,000 to 80,000 superficial feet of lumber per day and require from 25 to 45 per cent less driving power than mills employing circular saws. The latest thing in band saw-mills is a portable mill in which the log is stationary and the band saw, toothed on both edges, travels in guides lengthwise of the log, dropping the thickness of a board at each traverse and sawing at both the forward and return movements.

Many saw-mills employ both circular and gang saws. Both ordinary blade and band-saws are run in gangs and some band saws run on wheels as large as 10 feet in diameter. The mill is usually built upon the banks of a river or pond. The general construction is quite simple and consists of a saw floor and log deck built at an elevation of about 10 or 12 feet above the water level. A jack ladder constructed of heavy timber with its lower end resting on the bottom of the stream, leads up to the saw floor at the rear end of the mill. Ribbons of iron are fastened to the top sides of the ladder and form the track upon which the log car is operated. The arrangement and installation of the saws vary according to the size of the mills and the kind of work that is done. Since the depth of cut is less than

three feet, usually in mills handling logs of large diameter, increased depth of cut is obtained by mounting two saws one above the other, so that they cut in the same line — the upper one cutting down from the top of the log to the cut of the lower or main saw. In the mills in California, logs measuring up to 10 feet in diameter are sawed by arranging four saws one above the other, some cutting horizontally and others vertically, thus permitting the handling of very large trees.

The gigantic trunks of the redwood trees of California, Washington and other States on the Pacific Coast, ranging from 10 to 25 feet in diameter, are first quartered by explosions of gunpowder and then passed through the mills.

One great disadvantage in the use of circular saws is the excessive kerf waste, which is fully 20 per cent greater than that resulting from the use of the band or the gang saws, and is one of the principal reasons for the employment of the last named forms in the smaller mills where the uniform character of the lumber and the saving of raw material are important factors.

The majority of the American mills use single circular saws, but many of them have saws installed upon each side of the mill floor, and the logs are rolled to either side by the log jack placed in the centre of the building. In addition to these rotaries, the larger mills have from one to four gang saws.

The arrangements for handling the logs which are floated down upon the rivers from the distant forests to the mills, consist of piles driven at convenient distances apart, into the bed of the river adjacent to the mill, to which strong "booms" of logs, are attached by heavy chains and serve to hold the logs as in a pen, until they are required and also to leave a free channel in the middle of the stream. When the mill is in operation, the boomed logs are drawn from the water by an endless chain which runs in a V-shaped log slide and is provided with spikes to prevent the log from slipping back. The logs follow each other in endless succession. When a log reaches the log deck, it is loaded upon the skids by the action of a lever operated by the sawyer, which causes a pair of arms to rise through the mill floor and raise the log forcibly upon the skids. The skids lead to the log carriage, upon the "head blocks" of which the log is securely fastened by the insertion of a "dog," and it is then ready to be advanced to the saw. This is accomplished in several different ways — by rack and pinion worked by "cone feed," consisting of two parallel cones operating a belt which regulates the motion of the pinion shaft; by "rope feed," consisting of a wire rope which passes over pulleys set in the floor to a drum underneath, and is so arranged as to be under the control of the sawyer in the forward movement of feeding, or in the reverse movement of returning the carriage to its original position; or by "steam feed," commonly termed "lightning feed," derived from the force of a steam cylinder about 10 inches in diameter, which is laid upon the mill floor underneath the saw carriage to which the piston is attached. As the log is fed and when the first slab has been removed, the sawyer touches a lever and brings the "nigger," a piece of iron-bound timber with spikes upon its front face, through the floor. The spiked face catches the side of the log and turns it axially at once, to any desired position. If the log is being "canted," or prepared for the gang saw, the slabs are removed from the two opposite sides, a hook is thrown over the rear end of the cant so as to prevent it from returning with the saw carriage, and it is dropped upon a set of rollers which starts it toward the gang. From the time that the log is drawn out of the water and until it emerges from the gang, all of the operations are performed by machinery.

The finished product of saw-mills are beams, planks, boards, etc., of varying sizes in length, breadth and thickness, too numerous to enumerate specifically; laths, consisting of strips four feet in length, three-eighths inch in thickness and one and one-half inches in width, used for lath and plaster work. The total production of the 31,833 saw-mills in operation in the United States, in 1900, was over thirty billion superficial feet, with a market value of about $425,000,000. According to the United States census of 1900, these mills represent a total invested capital of $805,785,236, and give employment to 229,710 workmen. The 1914 census does not afford figures for comparison.

For technical description of saws see SAWS AND SAWING; METAL-WORKING MACHINERY, and WOOD-WORKING MACHINERY.

SAW-WHET OWL, a small American owl (*Nyctale acadica*), which takes its name from the rough tone of its cry. It is northerly in its distribution, ranging across the continent, but rarely dwelling as far north as Hudson Bay. It is not so large as a robin and has inconspicuous ear-tufts; bill black; cere tumid; general color: above, chocolate brown, streaked with white; below, white with brown stripes. Its food consists mainly of insects and its nest is made in a hollow of a tree, in an old crow's nest or any convenient place. Compare SPARROW-OWL.

SAWBILL, a motmot (q.v.).

SAWDUST, a general name given the accumulated particles caused by sawing wood, stone, etc. Besides the more common uses of sawdust, it is commercially valuable as the basis of various manufactures. Oxalic acid is manufactured on a large scale from wood sawdust. Sawdust is also used in the "carbonating" stage of the process for the manufacture of soda ash. The sawdust of mahogany and rosewood is used in dressing furs and the small fragments of some woods, such as the pencil cedar, made by saw cuts or the turning tool, yield perfumes. Sawdust sinks in water, though the wood from which it is cut floats.

SAWS AND SAWING. A saw is a tool consisting usually of a thin, flat blade of highly tempered steel serrated or having a series of triangular-shaped teeth usually on one of the edges, but sometimes on both edges. It is one of the most important of the various forms of cutting tools and is extensively used for working wood, metal, stone and other substances, but principally wood.

Saws are made in a great variety of forms and sizes in order to adapt them to the varying characteristics of the material worked and to suit them to the particular kind of work for which they are used and also to suit the circumstances attending the manner in which they are operated or handled.

For illustration of power-driven saws see WOOD-WORKING MACHINERY.

In this article the consideration of the subject will be confined to the construction and adaptation of the various makes of saws for

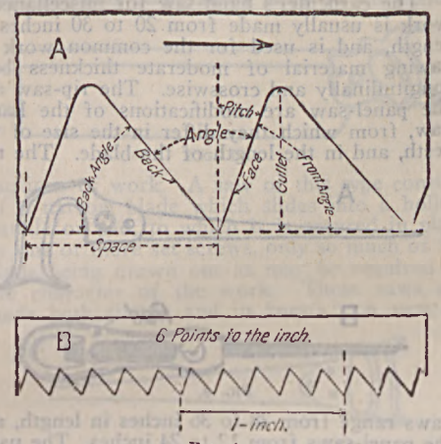


FIG. 1.

specific purposes and to the identification of their generally applied trade names with those purposes.

The characteristic action of the saw being the removal successively of minute portions of the material worked by the cutting or tearing action of a series of sharp edges thrust against the material indicates that it is essentially a tool adapted for cross-cutting or cutting at right angles to the fibre of the material. Necessity and custom, however, have compelled its application for ripping or cutting with the grain also, thus adapting it to work which otherwise would be accomplished by the use of cutting tools such as axes and chisels. These conditions define two primary classes of saws — the cross-cut saws and the rip-saws which divide all the different kinds of saws into two groups according to the general purposes for which they are used.

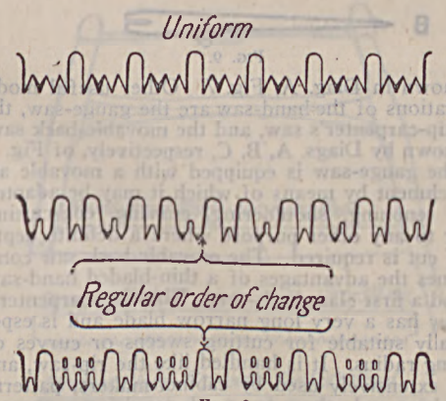


FIG. 2.

Saw Terms.— The principal terms used in describing a saw are as follows: (See Fig. 1, Diag. A).

Space.— The distance between two contiguous teeth, measured from point to point.

Pitch or Rake.— The inclination of the face of a tooth or the angle of the face of a tooth measured from a vertical line drawn through its point.

Gullet.— The depth of the tooth from the point to the root-line, the throat. Also the concave space at the back of a tooth.

Gauge.— The thickness of the blade, usually measured by the wire gauge.

Set.— The amount of lateral inclination given to the teeth, either to the right or to the left of the plane of the blade, in order to produce a kerf or cut of sufficient width to effect a proper clearance of the sawdust and to prevent the saw from binding or being pinched by the sides of the cut.

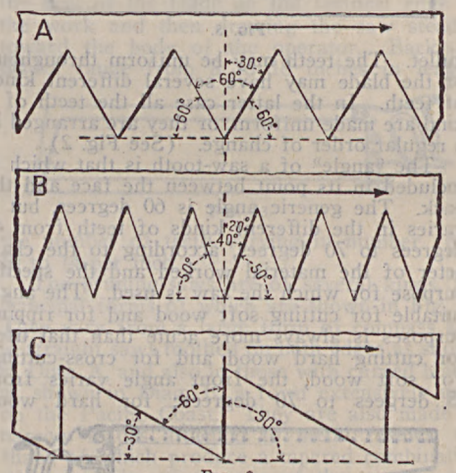


FIG. 3.

Fleam.— The side angle of a tooth.

Points.— The number of teeth points to an inch. The coarseness and fineness of saws are usually estimated by the number of points instead of the number of teeth to an inch, and it should be observed that there is always one less tooth per inch than there are points. (See Fig. 1, Diag. B).

The several parts of a saw-tooth are usually described by the following terms: (See Fig. 1, Diag. A).

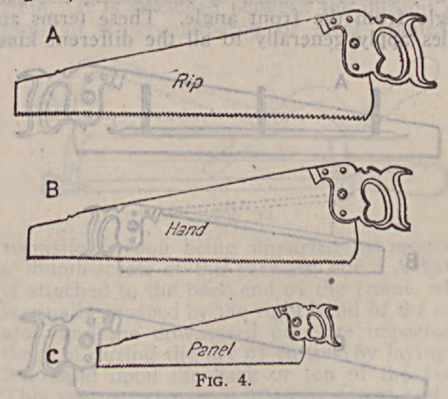


FIG. 4.

Face.— The front or cutting edge of the tooth.

Back — The following or back edge of the tooth.

Point.— The lower end of the V between

saw-teeth; in another sense the outer cutting extremity.

Saw-teeth vary in spacing, length or depth of gullet, angle, pitch, set, fleam and form of

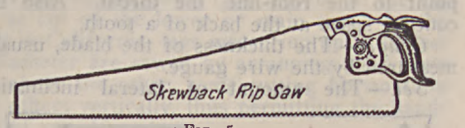


FIG. 5.

gullet. The teeth may be uniform throughout, or the blade may have several different kinds of teeth. In the latter case all the teeth of a kind are made uniform, or they are arranged in a regular order of change. (See Fig. 2).

The "angle" of a saw-tooth is that which is included in its point between the face and the back. The generic angle is 60 degrees, but it varies in the different kinds of teeth from 45 degrees to 70 degrees, according to the character of the material worked and the specific purpose for which the saw is used. The angle suitable for cutting soft wood and for ripping purposes is always more acute than that used for cutting hard wood and for cross-cutting. For soft wood, the front angle varies from 65 dergees to 70 degrees; for hard wood

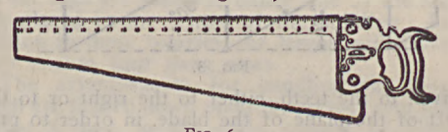


FIG. 6.

from 80 degrees to 85 degrees. In saws employed for cutting very hard knotty wood, and in those used for cutting metal, the teeth are arranged in a series of equilateral triangles, the pitch of each tooth being evenly divided between the front and the back. In saws used for a general line of work, the angle usually adopted is 40 degrees, with the pitch evenly divided. In saws used for cutting soft woods and for ripping purposes, an effective placing of the angle is attained by making the face upright, and sloping the back. (See Fig. 3, Diags. A, B. C, respectively). The pitch of a saw tooth is obtained by subtracting the back angle from the front angle. These terms and rules apply generally to all the different kinds

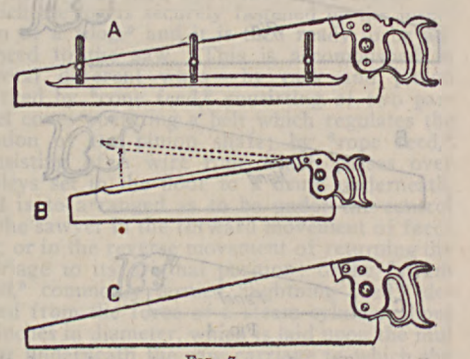


FIG. 7.

of saws from the smallest hand and machine saws used by jewelers, machinists and carpenters, to the largest power-driven saws employed in the various classes of saw mills.

The various kinds of saws manufactured and used at the present time are of the following named general types:

The rip-saw, the hand-saw and the panel-saw. (See Fig. 4).

The carpenter's hand-saw for miscellaneous work is usually made from 20 to 30 inches in length, and is used for the common work of sawing material of moderate thickness both longitudinally and crosswise. The rip-saw and the panel-saw are modifications of the hand-saw, from which they differ in the size of the teeth, and in the length of the blade. The rip-

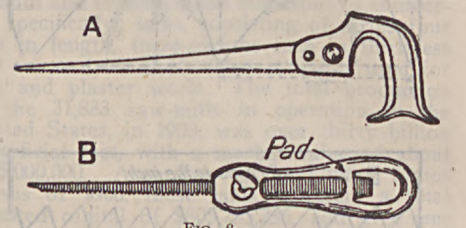


FIG. 8.

saws range from 28 to 36 inches in length, and the panel-saws from 12 to 24 inches. The usual spacing of the teeth of the three types is as follows: Hand-saws, 5 to 12 points per inch; rip-saws, three to five points at the heel or handle end, and six to eight points per inch at the point; and the panel-saws, 8 to 12 points to the inch. All three forms are made with a straight upper edge, or a "skewback" curve as shown in Fig. 5. A novel and useful form is represented by the "combination" saws. These are graduated along the upper edge, and sometimes furnished with a level attachment as

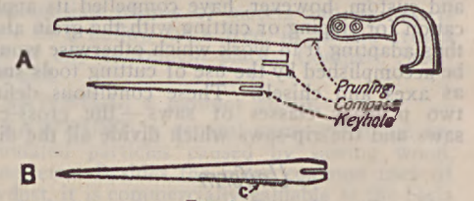


FIG. 9.

shown in Diag. A, Fig. 7. Other useful modifications of the hand-saw are the gauge-saw, the ship-carpenter's saw, and the movable-back saw, shown by Diags. A, B, C, respectively, of Fig. 7. The gauge-saw is equipped with a movable attachment by means of which it may be adapted to tenoning, shouldering, curving, cog-cutting or to any other purpose where a definite depth of cut is required. The movable-back saw combines the advantages of a thin-bladed hand-saw and a first class back-saw. The ship-carpenter's saw has a very long narrow blade and is especially suitable for cutting sweeps or curves of long radius. It is handled like the rip-saw, and is extensively used by cabinet-makers, pattern-makers and others for work requiring a narrow saw.

The compass-saw and its modifications, the various form of keyhole-saw, which are also commonly known as pad-saws and socket-saws, are shown in Fig. 8, Diags. A and B, respectively. The blades of the compass-saws range from 10 to 20 inches in length, and taper from one-eighth inch at the point to two or more inches at the heel. They are used for cutting

curves and sweeps by hand and are sometimes called table-saws. The regular keyhole-saw and its modification, the pad-saw, are simply smaller forms of compass-saws, and are used for cutting curves of small radius, such as keyholes and other small holes in the central

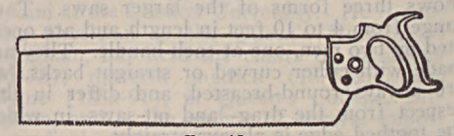


FIG. 10.

portions of work. A saw of this type consists of a narrow blade which slides into a hollow handle or pad, to which it is secured in place by one or more set screws, only so much of the blade being drawn out as may be required by the character of the work. These saws are made both simply and in "nests." A nest of

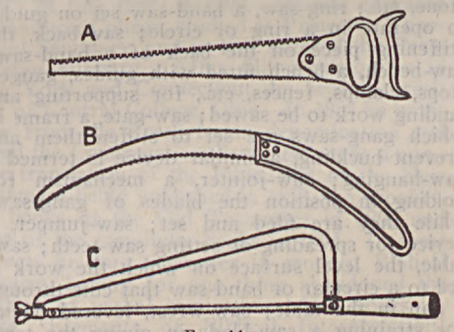


FIG. 11.

saws consists of a handle and three interchangeable blades, one each of the keyhole or pad, the compass and the table or pruning-saws. (See Fig. 9, Diag. A). A very useful novelty in this line is the nest of saws designed for cutting square holes. In this combination, the keyhole and compass blades are fitted with an attach-

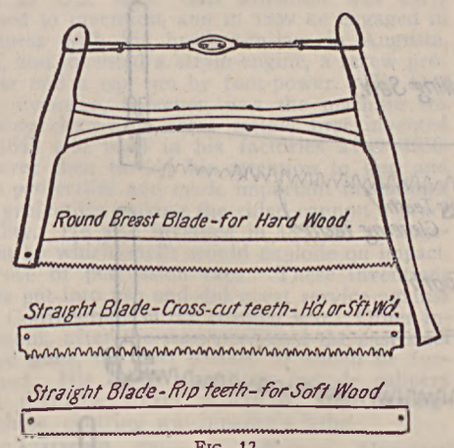


FIG. 12.

ment at right angles to the plane of the blade as shown at (C) Diag. B, Fig. 9.

The back-saws are a class of hand-saws characterized by deep thin blades stiffened with a metallic back as shown in Fig. 10. The principal forms are the mitre-box saw, the tenon-saw, the sash-saw and the dovetail-saw. The last named has the thinnest blade, so thin that simple filing gives the teeth sufficient set. The blades of the others are somewhat thicker and require a slight amount of set. All back-saws are best used in a mitre box or in some other form of guide rest. In cutting, they should be held firmly with the least practicable expenditure of force in controlling their direction, and the cut should be commenced by placing the heel of the blade on the farthest edge of the work and then drawing the saw steadily toward the body of the operator. Back-saw blades range from 8 to 18 inches in length,

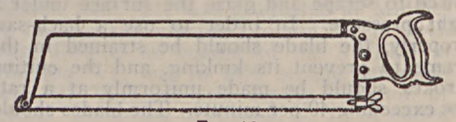


FIG. 13.

the number of teeth varying in number from 10 to 14 per inch.

The pruning-saws are of several kinds, the principal forms of which are shown in Fig. 11. They vary from a large form of compass saw to straight saws toothed on both edges as shown in Diag. A, and also to those with curved blades as shown in Diag. B, a form extensively used on the Pacific Coast. They are also made of narrow blades attached to metal frames, the shape of which produce a tapered combination which permits of the use of the saw in very narrow spaces. See Fig. 11, Diag. C.

The construction of the tapered pruning-saw places it on the dividing line between what may be termed the regular bladed saw and the frame saw. In the former, the pressure on the cutting edge is resisted by the rigidity of the blade itself, while in the latter the pressure is resisted by the distribution of the tension of the blade through the various parts of the frame. Of the frame saws, the most familiar are the wood-saws shown in Fig. 12, the butchers' saws shown in Fig. 13 and the hack-saws shown in Fig. 14. The last named is shown in its adjustable and extendable form, in which the frame may be lengthened or shortened to fit blades of varying length. The saw has a thin, narrow blade and equilateral triangular-shaped teeth. It is stretched between the upright portions of a wrought-iron or steel frame, the

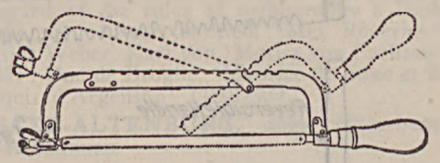


FIG. 14.

requisite tension being imparted by means of a thumb-screw at the forward end. A handle is attached to the back end of the frame, which is usually grasped by the right hand of the operator, and the downward pressure imparted to the tool during the act of cutting by laying the left hand upon the back or top of the frame. This saw is extensively used by fitters and mechanics for cutting odds and ends of metal, and has now become one of the most important tools in a machinist's toolbox. For general work, the blades are made with 14 teeth to the inch, but those used for cutting tubing and thin metal are

usually made with a greater number of teeth, about 25 per inch, in order to prevent a free bite and to reduce the danger of stripping the teeth. As in the case of the file, the fineness of the bite depends upon the number of the teeth in contact with the work; therefore, the judgment of the operator usually determines the amount of pressure that should be applied to the saw to suit the varying conditions of the cut. As in the case of other cutting tools, experience teaches that a hack-saw will work more effectively under a pressure sufficient to make the tool bite freely, than when it is allowed to scrape and glaze the surface under a light pressure. In order to use a hack-saw properly, the blade should be strained in the frame to prevent its kinking, and the cutting strokes should be made uniformly at a rate not exceeding 40 per minute. The blades should

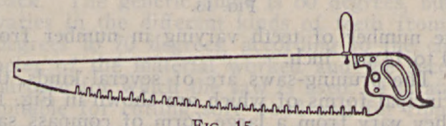


FIG. 15.

be as short as possible, so as to reduce the cost and the danger of breakage, and oil should *never* be used on the teeth as it decreases their cutting efficiency. The reverse is true in the case of wood-working saws. Hack-saw blades as regularly manufactured range from 6 to 18 inches in length. Those longer than eight inches for hand-saws and 12 inches for power-driven saws are seldom required. The rail-saw is a modification of the hack-saw, the height of the frame being increased to adapt it for large work, such as the cutting off of rails, large beams, girders, etc., and is found to be a very valuable tool for contractors. The frames are fitted to carry blades ranging from 9 to 18 inches in length.

The cross-cut saws employed for cutting timber and other large work are made in an almost innumerable variety of forms and sizes both as to the blades and to the teeth. The «one man» saws, shown in Fig. 15, range from three to six feet in length. The particular saw illustrated has the famous «Great American» tooth, commonly known as the M tooth. Fig. 16 shows three forms of the larger saws. They range from 4 to 10 feet in length and are operated by two men, one at each handle. They are made with either curved or straight backs, but are always round-breasted, and differ in this respect from the drag- and pit-saws, in which the toothed edge is always straight.

Other saw terms are defined as follows: Arbor, the shaft, spindle or mandrel of a circular saw; crown-saw, the end of a cylinder having saw teeth arranged to cut out a round hole, called also a cylinder- or drum-saw; jump-saw, a circular saw made adjustable in up-and-down position; razor-saw, a hardened steel toothless wheel made thin for cutting stone, etc.; ring-saw, a band-saw set on guides to operate in a ring or circle; saw-back, the stiffening piece on the back of a band-saw; saw-bench, a bench fitted with guides, gauges, stops, clamps, fences, etc., for supporting and guiding work to be sawed; saw-gate, a frame in which gang-saws are set to stiffen them and prevent buckling, a similar device is termed a saw-hanging; saw-jointer, a mechanism for holding in position the blades of gang-saws while they are filed and set; saw-jumper, a device for spreading or setting saw-teeth; saw-table, the level surface on which the work is fed to a circular or band-saw that cuts through a gap in the table; saw-wrest, levered device for straining a saw-blade in giving the teeth a spring-set. The saw industry of the United States is mainly confined to about 100 factories, having 4,500 employees. In 1914 these produced a gross value of $12,517,000, but more than half of this was the value of the steel and other materials used. The industry about doubled its production between 1899 and 1914. Illinois is

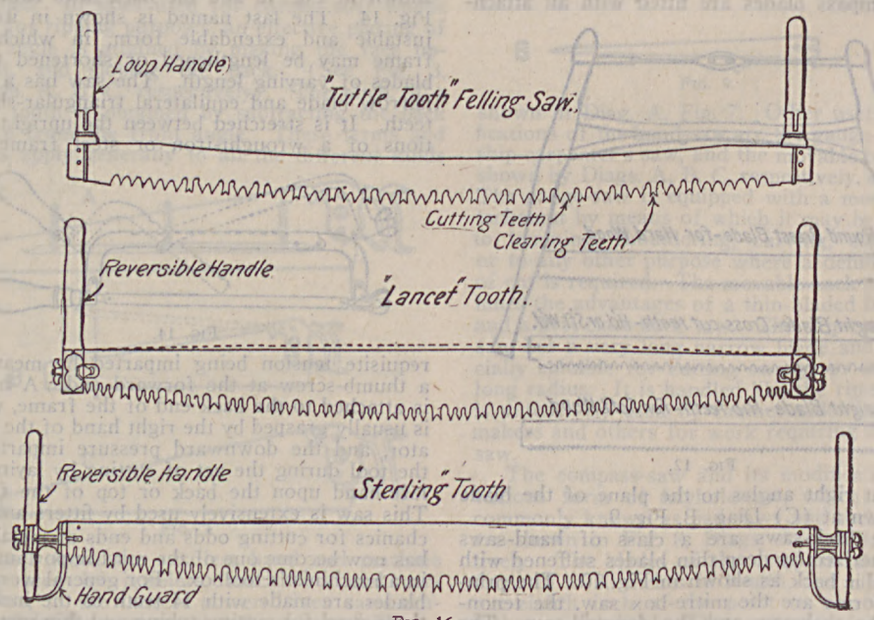


FIG. 16.

the leading State, followed by New York. See WOOD-WORKING MACHINERY; LUMBER INDUSTRY IN THE UNITED STATES.

SAWYER, sâ'yer, **Sir James,** English physician: b. Carlisle, Cumberland, 11 Aug. 1844. He was educated at Queen's College, Birmingham, and at the London University. He is consulting physician to the Queen's Hospital at Birmingham, has held the chairs of pathology (1875–78), materia medica (1878–85), and medicine (1885–91), at Queen's College, Birmingham, and is the author of several important medical works. Among them are 'Floating Kidney' (1883); 'Ether in Medication by the Skin' (1890), and 'Causes and Cure of Insomnia' (1904); 'Dietetics of Diabetics' (1904); 'Longevity' (1905); 'Maladies of the Heart' (1908); 'Coprotasis' (1912), etc.

SAWYER, Leicester Ambrose, American clergyman and Biblical scholar: b. Pinckney, N. Y., 28 July 1807; d. 1898. He was educated at Hamilton College, studied at Princeton Theological Seminary, and in 1832 entered the Presbyterian ministry. After filling pastorates in New York and Connecticut, he became president of Central College, Ohio. In 1854 he withdrew from the Presbyterian denomination and joined the Congregationalists. He made a complete translation of the Bible, that of the New Testament being published in 1858, the prophetical books of the Old Testament in 1860 and some of the remaining books in 1864. In some respects he was a pioneer in modern Biblical criticism, having for one thing abandoned the doctrine of verbal inspiration. His works include 'Elements of Biblical Interpretation' (1836); 'Mental Philosophy' (1839); 'Organic Christianity, or the Church of God' (1854); 'The Reconstruction of Biblical Theories, or Biblical Science Improved' (1862); and 'Final Theology' (1879).

SAWYER, Sylvanus, American inventor: b. Templeton, Mass., 15 April 1822; d. Templeton, 25 Oct. 1895. His attention was early turned to invention, and in 1839 he engaged in business with his brother-in-law in Augusta, Me., and invented a steam-engine, a screw propeller and a car run by foot-power. His first big invention, however, was the machine for making chair-cane from rattan, first invented in 1843 and used in his factories after 1850. Sawyer then turned his attention to gun and rifle projectiles and made important inventions, his projectiles making the rifled cannon a practicality. He also invented in 1853 an arrangement by which shells would explode on impact, by use of percussion caps. These inventions were put into use and did great service against the Confederacy in the ensuing war. Other inventions, after the war, perfected the cast-steel rifled guns, the first battery of which he furnished. His other inventions include calipers and dividers, steam generator, sole sewing-machine, centring watchmaker's lathe.

SAWYER, Thomas Jefferson, American Universalist clergyman: b. Reading, Vt., 9 Jan. 1804; d. 1899. He was graduated at Middlebury College in 1829, and held pastorates in New York (1830–45 and 1852–61). Between these periods he served as principal of the Liberal Institute at Clinton, N. Y., in which he also taught theology. He was one of the founders of Tufts College, Medford, Mass., where he became professor of theology. As an advocate of Universalist doctrine and as a scholarly controversialist he acquired a wide reputation. His discussion with Isaac Westcott was published under the title of 'The Doctrine of Eternal Salvation' (1854). He also published 'Who is Our God? the Son or the Father?' (1859), in which he controverted in particular some of the opinions at that period held by Henry Ward Beecher.

SAXE, săks, **John Godfrey,** American poet: b. Highgate, Vt., 2 June 1816; d. Albany, N. Y., 31 March 1887. He was graduated at Middlebury College and admitted to the bar in 1843. During 1850–56 he conducted the *Sentinel* at Burlington, Vt., and in 1856 became attorney-general of Vermont and deputy collector of customs. Removing to Albany, N. Y., he edited the *Evening Journal.* He was a conspicuous figure on the lecture platform and at scholastic anniversaries, where he often read his verse. His reputation as a humorous poet was considerable during the mid-century, his verses often appearing in *Harper's Magazine* and in the *Knickerbocker.* He published 'Progress, a Satirical Poem' (1846); 'Humorous and Satirical Poems' (1850); 'The Money King and Other Poems' (1859); 'The Masquerade and Other Poems' (1866); 'Fables and Legends of Many Countries' (1872), and 'Leisure Day Rhymes' (1875).

SAXE, Maurice, marshal of France: b. Dresden, 28 Oct. 1696; d. Chambord, near Blois, France, 30 Nov. 1750. He was a natural son of Augustus II of Poland. His military career was begun at the age of 12, and a few years later he was put in command of a cavalry regiment which took part in the war with Sweden. After the Treaty of Utrecht he attached himself to the army of France, and in 1720 was made camp marshal to the Duke of Orléans. He was offered the command of the Saxon army at the death of his father but chose to remain in the French service. For his defense of Alsace in 1743 he was created marshal of France. Carlyle has described his heroic conduct in the battle of Fontenoy, in his life of Frederick the Great. He was one of the most fearless but also one of the most dissolute men of his day. He wrote with a singular disregard of the rules of orthography a book on the art of war, entitled, 'Mes Rêveries.' Consult Weber, Karl von, 'Moritz von Sachsen' (1863); Duc de Broglie, 'Maurice de Saxe et le Marquis d'Argenson' (1891–93).

SAXE-ALTENBURG, săks ăl'tĕn-bĕrg. See ALTENBURG.

SAXE-COBURG-GOTHA, kō'bĕrg gō'tą, Germany, comprising the provinces of Gotha and Coburg, constitutes one of the central states of the republic, containing an area of 764 square miles. It lies on the south side of the forest of Thuringia. Its principal rivers are the Apfelstedt, Gera, Leina-Horsel, Nesse and Unstrut, in Gotha, and the Itz, Rodach, Lauter and Steinach, in Coburg. Both parts are mountainous with undulating and fertile tracts. The highest summits are the Great Beerberg (2,850 feet), the Schneekopf (2,829), and the Inselberg (2,655). The government is a constitutional monarchy. The educational institu-

tions are gymnasiums at both Gotha and Coburg; Salzmann College at Schnepfenthal; commercial school, Gotha; teachers' seminaries and technical schools in both towns; deaf and dumb institute, Coburg; and an observatory near Gotha. The Lutherans predominate. The chief occupations are agriculture and cattle-raising, especially in Coburg. The products are grain, peas, beans, hops, hemp, flax, potatoes (principal article of food) and wine. The forests yield timber, pitch, charcoal and potash. The chief manufactures include machinery, fireproof safes, nickel goods, rifles, papier-maché, tobacco, pipes, watches, toys, needles and pottery; besides textile button and paper industries. There are also numerous breweries, distilleries, tanneries, bleaching establishments and sawmills. The chief exports are grain, butter, fat, cattle, leather, wood, linen and other manufactured goods. Ruhla is celebrated for its meerschaum pipes and cigar holders, which are exported to all parts of the world. Inselberg, Schneekopf, Ruhla and Friedrichroda are picturesque towns and summer resorts; Neudietendorf or Gnadenthal is a Moravian settlement founded in 1742. The state returns one member to the Bundesrat and two to the Reichstag. The elder line of Saxe-Coburg was founded in 1680. The Duke of Albany, grandson of Victoria of England, succeeded to the duchy in 1900. Pop. 216,128, Protestants greatly preponderating.

SAXE-MEININGEN, mī'nĭng-ĕn, or **SAXE - MEININGEN - HILDBURGHAUSEN,** hĭld'boorg-how-zĕn, Germany, a central state of the Republic, in Thuringia. It belongs to the basins of three great rivers, the Weser, Rhine and Elbe; is hilly, and covers 953 square miles. The ridges on the north belong to the Frankenwald, on the east to the Thüringerwald and on the west to the Rhöngebirge. The highest summits are the Kieserle and the Bless, respectively 2,851 and 2,834 feet high. The high land is interspersed by fertile valleys, watered by the Werra and various tributaries of the Main and the Saale. There are several small lakes and some mineral springs. The soil is not very productive; in the higher districts it is unfitted for cultivation, but well wooded. The best land is in the valleys of the Werra and Saale. The chief crops are rye, oats, barley, potatoes and wheat. Hops, flax, tobacco and some wine are also grown in sheltered localities. The pastures are good, so that stock-raising is important. The chief minerals are roofing slate, salt and iron. There is a brisk manufacturing industry, especially in Sonneberg, Gräfenthal and Saalfeld. The principal articles include various kinds of hardware, glass and pottery, school-slates, marbles, all kinds of ingenious wooden and pasteboard objects, especially toys; and there is also a small textile industry. The principal exports, outside of the articles just mentioned, are wood, salt, wool and cattle. The schools include gymnasia, a normal college, technical schools, etc. The capital is Meiningen. The government until the collapse of the Empire in 1918 was a hereditary and limited monarchy. The line of Saxe-Meiningen was founded by Duke Bernhard, son of Ernst I of Saxony, friend and companion of Gustav Adolf of Sweden. Two-thirds of its present territory was added in 1826. In 1866 it sided with Austria. A compromise in 1871 terminated the long dispute, dating from 1826, concerning the respective rights of the duke and the Diet to the state lands. The state under the Empire sent two members to the Bundesrat and three to the Reichstag. Saxe-Meiningen entered the North German Confederation with the other states. In 1918 it became a component state of the German Republic and in 1919 adopted a Republican Constitution. Pop. 278,762, mainly Lutherans.

SAXE-WEIMAR, vī'mär, or **SACHSEN-WEIMAR-EISENACH,** ī'zĕ-năH, Germany, a central state of the new Republic, the largest of the Thuringian states, consisting of three large and 24 smaller divisions, the former comprising Weimar, Neustadt and Eisenach. The entire area comprises 1,388 square miles. The state is of circular form, with undulating surface and fertile soil. The Ilm, Saale and Unstrut are the principal rivers. The chief towns: Weimar, the capital, on the Ilm; Jena (with the general University of Thuringia), on the Saale; and Apoldo, in the west. Eisenach, the second division in size, yields the poorest crops. but contains fine forests and picturesque scenery. Its chief streams are the Werra, Hörsa and Ulster. Its highest summits are The Hohe Vogelheid, Glockner, Ringberg and Ottowald; the Hohe Rain, Elnbogen, Bayerberg and the Glaserberg. Eisenach is the only considerable town. Neustadt has no especially interesting features; its principal rivers are the White Elster, Weida and Orla. Neustadt, Auma and Weida are the chief towns. The chief occupation is agriculture in all parts of the state, and stock-raising is carried on to some extent. The manufacturing industries are important and include textiles, especially woolens, pottery, scientific instruments, pipes, tobacco, leather, cork, paper and glass. The chief imports, besides colonial goods, are raw wool, hides, coal, meerschaum (from Smyrna and Vienna), amber, horn, etc. The chief exports are timber, wool, gin and dried fruit. The chief centres of trade are Eisenach and Weimar. There are numerous breweries. The minerals are silver, copper, iron, manganese; besides salt and potters' clay. The government until 1918 was a limited hereditary monarchy and was constitutional. By becoming a component state of the German Republic, a Republican form of government was obligatory. A constitution was adopted in 1919. Most of the inhabitants are Lutherans, distinguished for their industry and intelligence.

The reigning family of Saxe-Weimar under the Empire was the oldest branch of the Ernestine line, thus of the Saxon house. Weimar in early times was the seat of a line of counts; it finally fell into possession of Frederick the Mild of Saxony, and did not acquire historical independence until 1640. Later it was split into several factions, but became reunited under Ernest Augustus. The reign of Charles Augustus, his grandson, marks the most brilliant epoch in the history of Saxe-Weimar. Goethe, Schiller and Herder were members of the illustrious literary society which Charles Augustus gathered about him, and the University of Jena became a focus of light and learning. This prince granted the duchy a constitution, and freedom of the press. In 1866 the grand duchy joined Prussia against Austria, and later entered into the North German Confederation. See GERMANY; WAR, EUROPEAN. Pop. 417,166.

SAXHORN. See HORN.

SAXIFRAGE, a plant of the typical genus of the family *Saxifragaceæ,* the name arising from an old Roman notion that the plants, which they often saw growing in cracks in rocks, had split the rocks themselves, and applying the doctrine of signature (q.v.), they concluded that the saxifrage would also break up stones in the bladder. The many species of saxifrage are found chiefly in the north temperate and arctic zones, increasing in number northwards; they are also characteristic of subalpine and alpine floras. This northern and mountain habit has made them valuable for rock-gardening, especially as the Alpine species have comparatively large flowers. The species are easily propagated by stolons and offshoots. Saxifrages are closely allied to the *Rosaceæ,* and have numerous regular flowers, mostly in corymbs or panicles, and white, yellow, or pink in color. The individual flowers are generally small, five-parted, with a two-celled ovary, becoming a small two-beaked pod with many seeds.

The London Pride (*Saxifraga umbrosa*) is much cultivated in European gardens, and sends up from a rosette of thick glabrous leaves small pink flowers panicled on a stem nearly a foot high. The purple saxifrage (*S. oppositifolia*) is one of most widely distributed species of Alpine and Arctic floras, and one of the first to bloom. It extends as far southward in the United States as Vermont, and carpets the rocks with its evergreen mats of thick foliage, nearly covered with solitary lilac blossoms. The most familiar saxifrages in eastern America are *S. virginiensis* and *S. pennsylvanica.* The former is one of the first spring plants to bloom. It grows in rock-crevices and begins to open its small white flowers, while they are still close to the rosette of spatulate leaves. As the spring advances, the naked, pubescent flower scape elongates until, in fruit, it is perhaps a foot high and branched in a loose panicle. The swamp saxifrage (*S. pennsylvanica*) is a little later in blooming, larger and frequents swamps and wet banks; it has greenish flowers in panicles, and oval to oblanceolate leaves.

SAXO-GRAMMATICUS, săk'sō gra-măt-ī-kŭs (that is, Saxo the Grammarian, or the Learned), early Danish historian: b. about 1140; d. Roeskilde, about 1206. He was a native of Denmark, of which kingdom and its dependencies he compiled history down to 1186 under the auspices of Absalom, bishop of Roeskilde, whose secretary or chancellor he appears to have been. This work, 'Historia Danica,' is written in good correct Latin, which Erasmus has praised, and occupied 20 years in its composition. Saxo chose as his models the later Roman historians, especially Valerius Maximus, yet in some of his expressions and in his mode of representation he is quite mediæval, though he stands at the head of his class. The work is divided into 16 books, the earlier of which give a highly colored and imaginative account of ancient Danish history as learned from tales and traditions and is full of living pictures of old heroic wars and adventures; the first nine books can scarcely be looked upon as reliable history, but when the writer approaches his own time his history is of the greatest value.

SAXON, the name of a Teutonic race, which took part with the Angles in founding Anglo-Saxon dominion in Britain, and which until a recent period was an important power in Germany. The Saxons (German *Sachsen*) were a warlike people, somewhat given to piracy, and during the existence of the Western Empire a thorn in the side of Rome. Charlemagne subdued them and caused them to become Christians. After the extensive Saxon emigration to Britain in the 5th century, those who remained in Germany were known as «Old Saxons.» The dukedom of Saxony was for a time the most powerful of the German states and Duke Henry in 919 was elected German king, his son, grandson and great-grandson succeeding him in that dignity. The duchy afterward passed (1127) to the Bavarian branch of the Guelf family, of which Henry the Lion (q.v.), celebrated for his contest with the emperor, was a member (1146–95). After several changes, which it is unnecessary to enumerate here, Frederick the Warrior, Margrave of Meissen and Landgrave of Thuringia, became (1424) Duke and Elector of Saxony. The union of these three countries rendered the Saxon elector one of the most powerful princes in Germany. After the death of Frederick the Good, son of Frederick the Warrior, Ernest and Albert, sons of the former, divided the family possessions between them (1485) and founded the Ernestine and Albertine Saxon lines, which still exist. The latter received Meissen or Misnia, and now constitutes the royal Saxon house. The former retained the electoral dignity and Thuringia. Ernest was succeeded in the electorate by his sons, Frederick the Wise (1486–1525), and John (1525–32). The former is celebrated as the protector of Luther, the promoter of the Reformation and the founder of the University of Wittenberg. By the Wittenberg capitulation (19 May 1547) the electoral dignity was transferred to the Albertine line in the person of Maurice. The Ernestine house is now divided into the two branches of Weimar and Gotha, the latter of which consists of the three lines of Meiningen, Altenburg and Coburg.

The duchy became a kingdom under Frederick Augustus I, who paid by the loss of a large part of his dominions the penalty for taking the side of Napoleon in the struggle between France, on the one side, and Russia Austria, Prussia, England and Sweden on the other. Saxony made another expensive blunder when it allied itself with Austria against Prussia in 1866, when the kingdom was spared on condition of paying 10,000,000 thalers to Prussia and entering the North German Confederation. In the war of 1870 against France the Saxons were on the side of Prussia and the feeling between the two courts has since been cordial. The Saxon people have ceased to be distinct from other Germans and national patriotism has taken the place of sectional jealousy. The Saxons possess the virtues without the faults of their distant ancestors and are noted for industry, frugality and thrift, while the average of comfort among the industrial and

agricultural classes is as high as in any part of Europe. See GERMANY; SAXONY.

SAXON ARCHITECTURE, the stage of early English architecture which preceded the Norman. The relics left us of this style exhibit its general characteristics as having been rude solidity and strength. The walls are of rough masonry, very thick, without buttresses and sometimes of herring-bone work; the towers and pillars thick in proportion to height, the former being sometimes not more than three diameters high; the quoins or angle masonry are of hewn stones set alternately on end and horizontally ("long-and-short" work); the arches of doorways and windows are rounded, or sometimes these openings have triangular heads, their jambs of long-and-short work carrying either rudely-carved imposts or capitals with square abaci. Sometimes heavy moldings run round the arches and when two or more arches are conjoined in an arcade these are on heavy low shafts formed like balusters. Window openings are often splayed both from the inside and from the outside and the windows themselves are small. On the outside of towers, walls, etc., there are often found slightly projecting pilaster-like shafts, usually formed of the long-and-short work characteristic of the quoins. See ARCHITECTURE.

SAXONY, săk'sn-ĭ (German, SACHSEN, zăk'sĕn), a state of central Germany, fifth in area and third in population of the states of the German Republic. It is surrounded by Prussia, on the north; Bohemia, south; Bavaria, southwest; Reuss, Saxe-Weimar and Saxe-Altenburg, west. It covers an area of 5,787 square miles, has the form of a right-angled triangle and lies mainly within the basin of the Elbe. It belongs to the central mountain region, only the districts near Leipzig and along the northern border sloping into the great north European plain. This tract is covered by peculiar and interesting sandstone formations. The chief mountain ranges are the Erzgebirge and Elstergebirge, along the southern border. The mountains of Upper Lusatia (2,600 feet) rise in the southeast, connecting with the Riesengebirge. That portion extending from Bohemia to Pirna on either side of the Elbe is wildly picturesque, hence the name "Saxon Switzerland." The highest summits in these mountains are no more than 2,000 to 2,500 feet high. The Fichtelberg in Oberwiesenthal (3,700 feet) towers above them all. The lowest point in the country is found where the Elbe enters Prussian territory, between Strehla and Mühlberg. The loftiest summits consist generally of sandstone and gneiss and are rich in mineral deposits; as the mountain ranges divide and merge into lower extensions, fertile valleys and plains are formed, suitable to agriculture. Most of Saxony belongs to the basin of the Elbe. At the east this river receives only minor affluents, but on the west has several important tributaries, the chief of which are the Mulde and Elster, themselves formed by the junction of smaller streams. The lakes are numerous, particularly in the north, but insignificant. Mineral springs are numerous; the chief are Bad Elster, Augustusbad, Neustadt, Warmbad (near Wolkenstein), Schweizermuhle, Wiesenbad, Hohenstein, Marienborn, Tharandt, Grünthal (sulphur and iron), etc. The climate in the higher districts, called Voigtland, is cold, otherwise analogous to other countries of Europe in similar latitude. Some marshy tracts on the Elbe and Pleisse alone are unhealthy. The Erzgebirge is that in which most rain falls. Leipzig enjoys the driest climate. Saxony is one of the most fertile parts of Germany, yet poor as compared to fertile soils elsewhere. Agriculture was long fettered by ancient customs, a condition no longer existing, and every inch of land now is developed to its utmost capacity. Sheep-farming has declined; cattle-raising is important. The forests are extensive; the mines, the oldest in Germany, are, with manufacturing, the chief sources of wealth. The principal crops are rye, and oats, potatoes (Voigtland), beets (for feed) and flax (Erzgebirge and Lusatian mountains). Enormous quantities of cherries, plums and apples are produced in the vicinity of Dresden, Leipzig and Coldetz. Vineyards, chiefly interesting for their antiquity, are found on the banks of the Elbe near Meissen and Dresden. The chief mining districts are Freiberg, silver and lead; Altenberg, tin; Schneeberg, cobalt, nickel and ironstone; and Johanngeorgenstadt, ironstone and silver mines. Coal occurs near Dresden and Zwickau. Peat is abundant in the Erzgebirge, sandstone on the hills of the Elbe; fine porcelain clay occurs near Meissen. Precious stones are found among the southern mountains, such as jasper, amethysts, fine topazes, etc. The textile industry is very important. The chief manufacturing centres are Zwickau, Chemnitz, Glauchau, Meerane, Hohenstein, Camenz, Pulsnitz and Bishofswerda and the principal articles are cotton, woolen, linen, damask and lace goods; other industries are straw-plaiting, wax-cloth, artificial flowers, stone and earthenware and porcelain ("Dresden china," celebrated); pianos, leather, cigars, paper and all kinds of machinery, especially at Chemnitz and Dresden; printing presses, breweries and distilleries; the smelting and refining foundries, chiefly at Freiberg. Leipzig is the centre of trade, especially for furs and books. The principal exports are the produce of the factories and mines. Commerce has developed rapidly. Education in Saxony is highly cultivated, and its foundations of schools and universities of ancient date. The university and conservatory of music at Leipzig; the endowed schools at Meissen and Grimma; the mining academy at Freiberg and school of forestry at Tharandt, are best known. The art collections of Dresden, the capital of the state, are celebrated. The government until 1918 was a constitutional monarchy. The reigning family was Roman Catholic, but 94 per cent of the population is Lutheran. Saxony under the monarchy returned four members to the Bundesrat and 23 to the Reichstag. Under the new constitution of the German Republic, adopted in 1919, Saxony with the other states was obliged to adopt a Republican constitution, with a universal, equal, direct, and secret franchise on the proportional system. Freedom of conscience, the press, and of assembly are guaranteed.

The duchy was founded in 880, and in 1423 passed into possession of Frederick, Elector of Saxony. The Ernestine line was succeeded by the Albertine line, now occupying the throne. Frederick Augustus embraced the Catholic religion (1697) to obtain the crown of Poland. The succeeding monarchs fought against France for Poland and in the Seven Years' war joined their forces to those of Austria against France. After the battle of Jena, however, Frederick Augustus III, the Elector, and his army fought with Napoleon, who conferred on him the title of king. In 1807 and 1809, Saxony acquired large additions of territory and in 1813 was the scene of Napoleon's struggles with his allies. The battles of Lützen, Bautzen, Dresden and Leipzig were followed by a congress at Vienna, when much of Saxon territory was ceded to Prussia (1814). A period of progress followed, interrupted by the revolution of 1848–49. In the Austro-Prussian War (1866) Saxony sided with Austria and Prussia would have incorporated the kingdom, had not Austria, supported by France, interfered and she was admitted into the North German Confederation. In the Franco-Prussian War, Saxony fought with the other German states against France. Albert (crown prince at that time) commanded the German forces on the Meuse. See WAR, EUROPEAN; GERMANY. Pop. 4,806,661.

SAXONY, Orders and Decorations of. See ORDERS, ROYAL.

SAXOPHONE, the name of a group of musical instruments invented by M. Sax. They consist of a conical brass tube, sounded by a mouthpiece furnished with a single reed similar to that of the clarinet. They have 20 holes covered by keys and studs for the first three fingers of each hand and are all fingered alike.

SAXTON, Joseph, American inventor: b. Huntingdon, Huntingdon County, Pa., 22 March 1799; d. Washington, D. C., 26 Oct. 1873. Having made his way to Philadelphia he was there employed in watchmaking and later in engraving, and devised, as his first invention, an ingenious machine for cutting the teeth of chronometer wheels. In 1830–37, after having constructed an astronomical clock with a compensating pendulum and original escapement, and having been admitted to the Franklin Institute, he was in England, where in June 1833 he exhibited before the British Association a magneto-electric machine. Here he won a considerable reputation as a maker of instruments of precision, constructing among various apparatus that by which Wheatstone measured the velocity of electricty in its passage through a long wire. Upon his return to the United States he was made constructor and curator of the standard weighing apparatus in the mint at Philadelphia, and in 1843 began the construction of the standard balances, weights and measures to be presented to each State for securing uniformity. In 1851 he was awarded a gold medal for a large balance of great precision exhibited at the London World's Exhibition of that year. He was also somewhat of a student of archæology, geology and mineralogy, and became a charter member of the National Academy of Sciences (1863). Consult the sketch by Henry in Vol. I of the 'Biographical Memoirs' of the National Academy.

SAXTON, Rufus, American soldier: b. Deerfield, Mass., 19 Oct. 1824; d. Washington, D. C., 23 Feb. 1908. He was graduated from West Point in 1849 and in 1855 became lieutenant. He led a surveying party across the Rocky Mountains 1853–54, was on the coast survey 1855–59 and instructor in military tactics at West Point 1859–60. He was chief quartermaster on the staff of General Lyon in the Missouri campaign, participated in the West Virginia campaign under General McClellan in 1861 in the same position and filled a like post with General Sherman in his Port Royal expedition of 1861–62. He was commissioned brigadier-general of volunteers in 1862, and defended Harper's Ferry against General Jackson in 1862, receiving a medal from Congress in recognition of his services. In 1862–65 he was military governor of the Department of the South, was brevetted major-general of volunteers in 1865 and mustered out of the volunteer service in 1866. After the war he served as chief quartermaster in the various departments until 1888 when he was retired with rank as colonel and assistant quartermaster-general.

SAY, Jean Baptiste, zhŏn bäp-tēst sä, French economist: b. Lyons, 5 Jan. 1767; d. Paris, 16 Nov. 1832. His early life was spent in England where he began a commercial career. The French Revolution called him to Paris, and his acquaintance with and interest in the social philosophy and political economy of his time to the staff of the famous *Courrier de Provence,* the journal of Mirabeau. He was afterward secretary to Clavière, Minister of Finance. At the close of the Revolution he conducted *La Dé cade,* a journal in which he presented with great clearness and ability the economic principles of Adam Smith, and such subjects as the public credit, the currency and taxation. He wrote 'Catechisme d'economie politique' (1815–18); 'Lettres à Malthus' (1820); 'Cours complet d'economie politique' (1828–30). Consult Guillaumin, 'Collection des economistes.'

SAY, Thomas, American naturalist: b. Philadelphia, Pa., 27 July 1787; d. New Harmony, Ind., 10 Oct. 1834. He was one of the earliest entomologists and is said to have discovered more species of the genus Insectivora than any naturalist before him. His contributions to natural science were contained in his reports upon his expedition to the coast of Georgia and Florida in 1818, and that as chief geologist to the United States Survey of the Rocky Mountain region under Major Long in 1819–20, and have been collected by later naturalists. He was one of the founders of the Academy of Natural Sciences in Philadelphia in 1812. In 1825 he joined Robert Owen in his communistic colony at New Harmony. Consult 'American Conchology,' edited by W. G. Binney (1858); 'American Entomology,' with memoir, edited by Le Conte (1859).

SAY AND SELE, sēl, **William Fiennes,** VISCOUNT, English politician and colonizer in America: b. 28 May 1582; d. 14 April 1662. From his first appearance in Parliament he was generally of the opposition, which found in him a tactician and debater of considerable skill. During the constantly increasing restiveness under the government of Charles I, he was a prominent malcontent; at the opening of the Long Parliament held high place in the

Lords by reason of his identification with the popular party in the lower house; recruited a regiment for Parliament; but from 1647 advocated compromise, and at the king's death retired. On the restoration he was made lord privy seal. With Lord Brook and 10 other associates he obtained from Lord Warwick and the New England Company a patent for a large tract on the Connecticut (19 March 1632). A shipload of colonists was sent over and Saybrook (q.v.) was founded under the immediate direction of Lion Gardiner (q.v.). Say and Brook also purchased a plantation at Cocheco (or Dover), in the present New Hampshire. Say later abandoned these enterprises, the Cocheco estate being made over to Massachusetts and Saybrook being sold to Connecticut. Consult Palfrey, 'History of New England' (1858).

SAYBROOK, Conn., town in Middlesex County, at the mouth of the Connecticut River, on the New York, New Haven and Hartford Railroad, 29 miles east of New Haven. It was first settled at Saybrook Point by the English in 1635. The town was incorporated in 1667; since then several townships have been separated from the original town: these are Chester (incorporated 1836), Old Saybrook (1852), Centerbrook (added to Essex, 1859). The industries include a box factory and the manufacture of ivory goods, of augers, gimlets and other small metal articles. The town-hall contains all the official records of the original town of Saybrook. There is a public high school, established in 1892. The Collegiate School of Connecticut (now Yale University) was located at Saybrook from 1701–16. Pop. 1,907.

SAYBROOK PLATFORM, a declaration of principles adopted in 1708 by the Congregational Church synod at Saybrook; substantially the same as the Cambridge platform (q.v.).

SAYCE, sās, **Archibald Henry,** English Assyriologist: b. Shirehampton, near Bristol, 25 Sept. 1846. He received his education at Queen's College, Oxford, where he was graduated in 1868. He was elected a Fellow in the following year and became a tutor in 1870. In 1876 he was appointed deputy professor of comparative philology at Oxford, and since 1891 has occupied the chair of Assyriology in the same university. He was a member of the Old Testament Revision Company. He is an honorary member of the Asiatic Society of Bengal, the Royal Academy of Spain and the Anthropological Society of Washington. His larger and more important works are 'An Assyrian Grammar for Comparative Purposes' (1872); 'The Principles of Comparative Philology' (1874); 'The Astronomy and Astrology of the Babylonians' (1874); 'Lectures on Babylonian Literature' (1877); 'Introduction to the Science of Language' (1880); 'The Vannic Inscription Deciphered and Translated' (1882); 'The Ancient Empires of the East' (1884); 'The Origin and Growth of Religion as illustrated by the Religion of the Ancient Babylonians' (1887); 'Life and Times of Isaiah' (1889); 'The Higher Criticism and the Verdict of the Monuments' (1894); 'Early History of the Hebrews' (1897): 'Babylonians and Assyrians' (1900); and 'Assuan Papyri' (1906). The following popular works: 'The Monuments of the Hittites' (1881); 'Assyria: its Princes, Priests and People' (1882); 'The Hittites' (1889); 'The Races of the Old Testament' (1891); 'Social Life among the Assyrians and Babylonians' (1839); 'The Egypt of the Hebrews and Herodotos' (1895); 'Murray's Handbook of Egypt' (1896); and 'Israel and the Surrounding Nations' (1898).

SAYLES, sālz, **John,** American jurist: b. Vernon, N. Y., 9 March 1825; d. Abilene, Tex., 22 May 1897. He was graduated from Hamilton College, Clinton, N. Y., but studied law in Texas, where he was admitted to the Supreme Court of his adopted State, and from 1853 to 1855 served in the Texas legislature. His first contributions to the literature of jurisprudence were published soon after the close of the Civil War, in which he served as brigadier-general in the Confederate army. In 1880 he became a professor of law in Baylor University, Texas. His writings include 'A Treatise on the Practice in the District and Supreme Courts of Texas' (1858); 'Treatise on the Civil Jurisdiction of Justices of the Peace in the State of Texas' (1867); and 'Revised Civil Statutes and Laws Passed by the Legislature of Texas' (1888).

SAYRE, Lewis Albert, American surgeon: b. Battle Hill (now Madison), N. J., 29 Feb. 1820; d. New York, 21 Sept. 1900. He was graduated from Transylvania University in 1839, and three years later from the College of Physicians and Surgeons in New York. He was made professor of orthopedic surgery in the medical college of Bellevue Hospital in 1861, and professor emeritus at its consolidation with the New York University in 1898. In 1854 he successfully performed the first operation in the United States for the removal of the head of the femur in hip-joint disease, and became known as the greatest American orthopedist. His original methods and his invention of instruments used in the treatment of deformed children made his name familiar to the entire medical world. He was the author of 'Practical Manual of the Treatment of Club Foot' (1869); 'Orthopedic Surgery and Diseases of the Joints' (1876), etc.

SAYRE, Stephen, American banker and patriot: b. Long Island, 1734; d. Virginia, 27 Sept. 1818. He was graduated from the College of New Jersey (Princeton) in 1757, became a merchant and banker in London, attained there considerable influence in political circles, but was committed to the Tower on an unwarranted charge of treason. The affair soon ended in his release; but his banking business failed as a result and he was compelled to withdraw from England. Subsequently he was private secretary to Franklin, went with Arthur Lee's embassy to Berlin and at Copenhagen, Stockholm and Saint Petersburg was successful in obtaining supplies for the furtherance of the cause of independence. He was an opponent of Washington's administration in 1795.

SAYRE, Theodore Burt, American novelist and playwright: b. New York, 18 Dec. 1874. He was graduated from the New York College of Pharmacy in 1892, but almost immediately began to write for the stage. In 1896 his 'Wife of Willoughby' was produced at the Lyceum in New York, and in the following year his 'Charles O'Malley' at the Lafayette in Washington. These were followed, among others, by 'A Classical Cowboy' (1900); 'Edmund Burke' (1905); 'Eileen Asthore' (1906); 'O'Neill of Derry' (1907); 'The Wearing of the Green' (1910); 'Love's Young Dream' (1912); 'The Irish Dragoon' (1915), etc. He also produced the novels 'Two Summer Girls and I' (1898); 'The Son of Carleycroft' (1900); 'Tom Moore' (1902).

SAYRE, Pa., borough in Bradford County, on the north branch of the Susquehanna River, and on the Lehigh Valley Railroad, about 15 miles north of Tonawanda, the capital of the county, and 18 miles southeast of Elmira, N. Y. Sayre is in an agricultural region and near the coal fields of the State. The industries are connected chiefly with farm and dairy products. The chief industrial establishments are machine shops, stove fixture works, metal works, lumber and coal yards. There is considerable trade in the shipment of farm and dairy products and poultry. The borough has a high school, elementary schools, a public library and (1918) two national banks with combined capital of $100,000 and resources of $1,623,272. Pop. (1920) 8,078.

SAYULA, sä-yoo'lä, Mexico, a town in the state of Jalisco, situated 55 miles south of Guadalajara. Agave and sugar are cultivated in the surrounding country, and the town has a thriving commerce. Pop. about 8,000.

SAZONOFF, sä'zō'nŏv, **Sergi Dimitrievich,** Russian statesman: b. 1861. Entering the diplomatic service, he was second secretary at the Russian embassy in London from 1890 to 1894 and councillor of Embassy 1904–06. His skilful handling of the difficulties arising from the Dogger Bank incident in 1904 marked him for promotion. From London he went to Rome in 1894 as secretary to the newly-created mission to the Holy See, and in 1906 he returned to Rome as Minister to the Vatican. In 1909 he was recalled to Russia to assist M. Isvolsky, then Foreign Minister, whom he succeeded in 1910. A year later he exchanged views in Paris with the French government, and in 1912 visited the king of England. In the diplomatic crisis preceding the European War, M. Sazonoff appeared to be the only allied statesman who saw the one method of averting the impending conflict. In the words of Mr. G. Bernard Shaw, "One man among them keeps his head and looks the facts in the face. That man is Sazonoff, the Russian Secretary for Foreign Affairs" (*Current History,* Vol. I, p. 19). In a telegram from Saint Petersburg dated 25 July 1914 the British Ambassador, Sir George Buchanan, informed Sir Edward Grey of an interview with Sazonoff, in the course of which the latter said that "he did not believe Germany really wanted war, but her attitude was decided by ours" [the British attitude]. "If we [Great Britain] took our stand firmly with France and Russia there would be no war. If we failed them now, rivers of blood would flow, and we would in the end be dragged into war. . . . His Excellency said that unfortunately Germany was convinced that she could count upon our neutrality" (*British Blue Book,* dispatch No. 17). M. Sazonoff resigned his office in July 1916, and in January 1917 was appointed Ambassador to Great Britain, but retired shortly afterward.

SBARETTI, sbä-rĕt'tē, **Donatus,** Italian Roman Catholic prelate: b. Montefranco, Italy, 12 Nov. 1856. He was educated at the College of Saint Apollinaris, Rome, and was ordained in 1879. For eight years after his ordination he occupied the chair of speculative and moral philosophy in the College of the Propaganda, Rome, and subsequently served as subsecretary of the Propaganda in affairs concerning the United States. He was made private chamberlain to Leo XIII, with title of monsignore, and in 1893–1900 was the first to occupy the office of auditor of the Apostolic legation at Washington. He was consecrated bishop of Havana in 1900, appointed extraordinary Apostolic Delegate to the Philippines in 1901, titular archbishop of Ephesus later in that year, and since 1902 has been Delegate Apostolic to Canada.

SCAB, or **SCABIES,** a skin disease in sheep, analogous to the itch in the human subject and to mange in horses and dogs. It is caused by a parasitic mite, *Sarcoptes scabiei.* See ITCH.

SCABBARD-FISH, the name of certain pelagic fishes, allied to the mackerels, and so called because of their compressed and elongated shape. One is *Lepidopus caudatus,* rare in American waters, but known in the eastern Atlantic, Indian and south Pacific oceans. It is the "frost-fish" of New Zealand, where it comes ashore in the surf on moonlit winter nights, and is caught on the beach by men watching for it. It is a favorite food-fish and reaches a length of five or six feet, but weighs only about six pounds. Another is the cutlass-fish, silver-fish or hair-tail (*Trichiurus lepturus*), which attains a length of three feet or more, and whose tail ends in a filiform point without a caudal fin. It is found on the American coast from New England to South America, and is silvery, with a golden lateral line and grayish-yellow dorsal; the lower jaw is the longer, with two teeth projecting beyond the upper when the mouth is closed, and the whole armature of the jaws indicates carnivorous habits. It is rarely seen except when found benumbed with cold floating on the surface.

SCAD, a name given to several species of fishes of the family *Carangidæ;* in the United States to *Decapterus punctatus,* a fish about a foot long found along most of our Atlantic coast and abundant southward, where it is a foodfish of some importance. In England the name belongs to the fish also called horse-mackerel (*Trachurus trachurus*) which appears in large shoals and is dusky olive on the back, the sides variegated by bands of bluish. It is also known as saurel, cigar fish, round robin, etc. A related species (*Trachurops crumenophthalmus*), common in the West Indies, and known on most tropical coasts, is called big-eyed scad.

SCÆVOLA, sĕv'ō-la, **Caius Mucius,** Roman hero and founder of the plebeian family of Mucii: lived about 600 years B.C. Livy tells how Caius Mucius, a young patrician, sought to kill Porsenna of Clusium, the protector of the expelled Tarquins, who was besieging Rome and had reduced the city to great dis-

tress. Mucius went to the tent of Porsenna to kill him, but mistaking his secretary for the chief plunged his sword into him. Porsenna, in rage, had Mucius brought before him, whereupon the young Roman expressed regret at not having killed Porsenna himself, and told him that other attempts would be made and would be successful. Upon Porsenna threatening to have Mucius burned alive if he did not betray the conspirators, Mucius thrust his right hand into a flame and held it there. Porsenna, in admiration for this fearlessness, ordered the young Roman freed, and the latter in return for his courtesy told Porsenna that 300 Roman youths had sworn to assassinate him or die in the attempt. This so alarmed Porsenna that he raised the siege and withdrew from Rome. Scævola, meaning "the left-handed," was the name bestowed upon Mucius in honor of his deed. Quintus Mucius, called "the augur," a Roman tribune, prætor and consul, d. about 100 B.C., and Quintus Mucius, called "the pontifex," Roman tribune, consul and pontifex maximus, d. 8 B.C., are descended from Caius Mucius Scævola.

SCATELL, ska-tĕl', or **SCAW FELL,** England, a mountain in the county of Cumberland, bordering on Westmoreland, 13 miles southwest of Keswick. It rises from the centre of the lake region, its two peaks reaching an elevation respectively, of 3,229 and 3,092 feet, making the mountain one of the conspicuous features of the scenery. It consists of granite with a superformation of slate, excepting the summit which is composed of trap porphyry.

SCAGLIOLA, skăl-yō'la, an Italian term for an imitation marble used in columns, walls and floors for surface decoration. It was invented by Guido del Conte in Modena in the early part of the 17th century. It is composed of plaster and glue mixed with splinters (scagliole) of spar, marble, granite, concrete, gypsum, veins of clay, etc., artificially colored and smoothed down and polished to a semblance of the quality of polished marble.

SCAIFE, Walter Bell, American author: b. Pittsburgh, Pa., 10 Sept. 1858. He was graduated at the University of Michigan in 1880 and subsequently studied at Johns Hopkins and at the University of Vienna. Since 1889 he has lectured at Baltimore, Pittsburgh, Washington and Boston on history and other subjects. He published 'American Geographical History, 1492–1892,' 'Florentine Life During the Renaissance,' 'A Dissertation on Law and History,' 'A History of Geographical Latitude' (1889); 'The Boundary Dispute between Maryland and Pennsylvania' (1885); 'The Public Schools of Geneva' (1895); 'Legislative Elections in France' (1898); 'A Century's Labor Legislation in France' (1899); 'Organized Labor in France' (1900); 'Work and Wages in France' (1900); 'Labor Conditions in Switzerland' (1901); 'Auto-Dominis' (in Italian, 1914); 'From Energy to Wisdom' (1917).

SCALA, La, lä skä'lä, Milan, Italy, a historic theatre and opera-house opened in 1778, with accommodation for 3,600 auditors.

SCALD-HEAD, an affection of the scalp, as ringworm of the head, etc., the term being vulgarly applied to various disorders similar in nature. See RINGWORM.

SCALE, from Lat. *scala,* ladder or staircase, *in music,* the tone ladder marking the regular succession of intervals in any given key, from the keynote to the octave, and indicating the relative pitch of tones. See MUSICAL ELEMENTS AND TERMS; MODE.

SCALE INSECTS, certain species of the family *Coccidæ* (see COCCUS). Some species of this family popularly called mealy bugs more often than scales, are readily distinguished by being free-moving, whereas the scales proper are stationary except for a few hours after birth or hatching. The males of the family are remarkable in having a complete metamorphosis (other *Hemiptera* have incomplete, and so do the females of this family), one pair of wings, a pair of hooks replacing the rear wings, and an extra pair of eyes in the adult, instead of mouthparts. The female has six legs when newly hatched, but after molting the legs are wanting and the insects are grub-like, stationary, wingless, and are concealed beneath a powdery, cottony or waxy secretion and the cast-off skins. On account of their appearance some of the species are called gall insects, a name more correctly applied to species of the family *Cynipidæ* and *Gallicolæ,* which produce nut-galls or galls.

The family embraces several species which have been useful to man for many centuries and also some that are troublesome upon cultivated plants. The scarlet grains of Poland are scale insects (*Coccus polonicus*) found on the roots of knawel and were formerly an important article of commerce, being used in dyeing various fabrics. Another species found on the roots of burnet has long been used by the Moors for dyeing wool and silk various tints of pink. Kermes or scarlet grain is the dried body of *Lecanium ilicis* which lives on the young shoots of the kermes oak (*Quercus coccifera*), a low evergreen shrub common from Spain eastward to India. In parts of this region this insect furnished a source of revenue to the people. The females grow about as large as peas and before the eggs are hatched, during May, they are gathered, dropped into vinegar, dried in the sun or in ovens, and sold. They have been used for ages to dye cloth a dark brownish-red, but except locally they are almost entirely superseded by cochineal. See COCCUS.

Cochineal is a species (*Coccus cacti*) of the mealy bug group. It is a native of Mexico where it feeds upon certain species of cactus, especially the nopal (*Opuntia cochinellifera*), a kind of prickly pear (q.v.). It is also found in many regions where this plant has been introduced, notably in the Canaries, Java and the Mediterranean region, in some parts of which it has been cultivated. In Mexico pieces of the cactus covered with the insects are cut out at the close of the dry season and protected until the end of the wet season, when they are used for re-stocking the plantation in October. The females lay about 1,000 eggs, about 99 per cent of which produce females. In December the first crop is gathered and other harvests are made until May when the rainy season begins. The females are brushed off the water, or on hot irons, and dried. They usually lose more than half their weight in the process. A days' work is represented by about two ounces of dried insects — that is, more than 8,000! These insects have been used for dyeing scarlet and crimson, for which purposes they are unequaled, though coal tar products, being cheaper, more readily procured, and in greater variety, have largely replaced them. They are used also for manufacturing pigments such as lake and carmine (q.v.) and for coloring confectionery. See COCHINEAL.

Several other species have been used for dyeing, some being employed by the ancient Egyptians, Jews and Persians for giving the brilliancy or delicacy of tint to certain fabrics formerly highly valued by these nations and the peoples embraced in their commerce.

Other members of the family are noted for their wax, which is used in some countries for candles, varnishes, sealing wax, lacquer and many other purposes. The wax insect of China (*Coccus sinensis*) is a small white species which lives upon sumac and other trees upon the branches of which it deposits its secretion. This resembles hoar frost during June, but becomes somewhat darker and more continuous by August when it is scraped off and melted in boiling water. After straining and cooling it is ready for use. The French have introduced this species into Algeria. In South America another species is locally, but not commercially, important as a source of wax and in other countries are several species that might become similarly useful. But the principal species are the lac or shell-lac insects of Asia. See LAC.

Among the species considered troublesome upon cultivated plants perhaps the cottony cushion scale (*Icerya purchasi*) is perhaps the most noted in the United States. This is an Australian insect which was accidentally introduced into California where, being free from the conditions that held it under control in its native habitat it spread rapidly upon orange, lemon and other citrus trees to the dismay of orchardists. It was found that certain species of ladybird beetles (q.v.) play important rôles in checking the spread of this scale in Australia; so, some were imported in the hope that they would eradicate the scale in California. They did. The scale is now practically extinct in California and the lady-bird beetles, being deprived of their food supply, have followed it, since they seem to be unable to adapt themselves to other foods. This is one of the most remarkable instances of man's intervention to bring natural controls to his aid instead of resorting to artificial methods which are frequently cumbersome or unsatisfactory.

The armored scales of the sub-family *Diaspinæ* are generally of small size, but being exceedingly prolific and voracious are of ill-repute. They are generally flattened or slightly convex, covered with a parchment-like membrane, and are of many shapes. The larvæ are either hatched from eggs or are born. They crawl to a suitable place to feed, usually before they are a day old, and become fixed. They are tiny, flat, six-legged larvæ with a pair of feelers and with long sucking beaks. Soon waxy threads appear, coalesce and cover the creatures. After molting the larvæ are legless. After the second molt the males can be readily recognized, being a pupa with wings, legs and antennæ visible; the females become still more grub-like. The male soon emerges, flies a short time, pairs and dies. In some cases the females hibernate, in others they lay eggs, in others bear young, sometimes there may be several generations in a season. Some of the best-known species are the oyster-shell scale, especially *Mytilaspis pomorum,* which is well known upon apple, lilac, willow and other trees. They are named from the shape of the scale, which resembles the shell of some kinds of oysters. This species winters in the egg, the young appear in May, and in the North there is only one brood; two in the South where the insects are believed to hibernate. A very similar species lives upon citrus fruits, and specimens may often be found upon oranges and lemons, especially those that come from the Mediterranean region. The San José scale (*Aspidiotus perniciosus*) is viviparous and enormously productive. It lives upon the woody members of the order *Rosaceæ,* for example, apple, cherry, rose and pear, and upon currants, gooseberries, elm, chestnut, oak, walnut and many other trees and shrubs. The scurfy scale (*Chionaspis furfurus*) is an oval scale with the cast skin at the small end and is frequently found upon apple and pear trees. The red scale of the orange is a close relative of the San José scale and is well known in California, Florida, etc. See ORANGE.

The cottony maple scale (*Pulvinaria innumerabilis*) is often found on Virginia creeper, grapevines, and some other plants, as well as on maples. It is a soft scale which is usually rather conspicuous in spring from its cottony appearance upon the young growths. The "cotton" is really a gum since it can be drawn out into cobweb-like threads. The black scale (*Lecanium oleæ*) is another soft scale which is well known to California olive and orange growers.

Several species of scale insects are found in greenhouses and nurseries devoted to ornamental plants. But they present no more remarkable features in life-history or habits than the preceding, and being of somewhat smaller importance need not be discussed specifically.

Where the natural controls seem to be inadequate to cope with the species various artificial methods have been tested to determine their efficacy. But in many instances these are so cumbersome, expensive, dangerous either to plant or operator, and difficult to apply intelligently, that they have been discarded. Spraying and fumigation are the principal ones in vogue. But it seems highly probable that in many instances the natural controls would hold the scales in check. Man has, however, not yet discovered these controls except in a few cases and in most of these has not made use of them more than experimentally.

Consult numerous bulletins of the agricultural experiment stations and the United States Department of Agriculture; also references under INSECTICIDE.

M. G. KAINS.

SCALE-TAIL, an African flying squirrel of the family *Anomaluridæ,* distinguished from the true squirrels by dentition and various other peculiarities, and especially by the possession of a series of strong keeled scales at the root of the tail, which seem to serve as an aid

in climbing. There are several genera and species, of which the best known is *Anomalurus pedi* of the Gold Coast, which is black and white, and is regarded as a delicacy by the natives. The food and habits are similar to those of the northern flying-squirrels.

SCALES. See BALANCE.

SCALIGER, skăl'ĭ-jẽr, **Joseph Justus,** French scholar and author: b. Agen, France, 4 Aug. 1540; d. Leyden, France, 21 Jan. 1609. He was the 10th son of his learned father, Julius Cæsar Scaliger (q.v.), and received from him a fine classical education, as well as a boastful and arrogant nature. He studied Latin at Bordeaux, and Greek at Paris. According to Henisius, he shut himself into his room and committed the whole of Homer in 21 days; he memorized the rest of the Greek poets in three months and the entire body of Greek literature in two years. It was his boast that he was equally familiar with 13 languages. In his 22d year he was converted to Protestantism, a fact which probably retarded his advancement in France. From this period until 1578 he traveled extensively making a poor living from his teaching and writings, but refusing the money offered him by admiring patrons. In 1578 he became professor of belles-lettres at Leyden, a position which he held until his death. Joseph Scaliger's most important works are upon chronology. His 'De Emendatione Temporum' (1583) gave the first complete scientific chronology, and for this work, with his 'Thesaurus Temporum' (1609), and on account of his discovery of the Julian Period, he deserves to be called the founder of the science of chronology. He also annotated the principal works of the chief Latin writers.

SCALIGER, Julius Cæsar, Italian classical scholar: b. Riva, Lake Garda, 23 April 1484; d. Agen, France, 21 Oct. 1558. He is generally accepted as the son of Bendetto Bordoni, a miniature painter of Padua, but Scaliger claimed descent from the Scaligeri princes of Verona, as did his son, Joseph Justus Scaliger. The elder Scaliger, according to his own account, was a page of Emperor Maximilian for 17 years, then received a pension, studied at Bologna, commanded a squadron under the French viceroy, studied natural law, and in 1525 accompanied the bishop of Agen to his diocese in France where he settled as physician. In 1530 he married a lady of rank and from that time put forth pretentious claims as to his ancestry. He was a man of unusually great learning, a versatile Latin poet, but bold and arrogant, so that while his writings brought him admirers among the scholars of his day, his personal conduct gained him many enemies. His principal works include commentaries on the work of Hippocrates 'De Insamnis' (1538); of Aristotle, 'De Plantis' and Theophrastus, 'De Causis Plantarum' (1566); an attack on Erasmus, 'Oratio pro Cicerone contra Erasmum' (1531), 'De Causis Linguæ Latinæ' (1540); 'Poetices Libri VII' (1561).

SCALLOP, a well-known bivalve mollusk. The scallops form a family (*Pectinidæ*) related to the oysters, which they resemble in having a single adductor muscle. The genus *Pecten,* which in the wide sense is nearly coextensive with the family, has the following characteristics: The shells are more or less orbicular, with an ear developed on each side of the umbo, making a straight hinge-line, generally ornamented externally with more or less developed radiating ribs. The hinge-teeth are lamellar, but usually small and obscure, the principal ligament is internal and solid, and the muscle-star is single. The mantle margins are open all around, reduplicated and, besides a fringe of tactile filaments, bear numerous conspicuous eyes of a brilliant blue or silvery lustre. These eyes are the most complex known among the *Pelecypoda* and consist of a nervous layer, a choroid coat, lens and cornea and receive an optic nerve from the circumpallial trunk. The gills are delicate and of peculiar structure, the foot small and papilliform and in the young has a byssus gland, and the genital ducts open into the kidneys or near their apertures. Only the posterior adductor muscle is present, and this is large, round, central, and remarkable from its constitution in part of striated and in part of nonstriated fibres. Scallops are remarkable, especially when young, for their activity, and swim in a peculiar jumping fashion by opening and powerfully closing the shell valves as though flying, thus forcing out the contained water and propelling themselves forward. As they become older and the shells heavier they are more quiescent. Fully 200 living and a still greater number of fossil species are known beginning in the Carboniferous strata. Perhaps 40 species occur in North American waters, the great majority southward and in moderately deep water. Several of our own and foreign species are of commercial importance, furnishing the well-known scallops of the markets. *P. jacobæus,* a native of the Mediterranean, is the scallop shell which pilgrims were accustomed to wear in front of their hat in token of having visited the shrine of Saint James at Compostella.

Although the richly colored and beautifully formed shells of the scallops are much used in fancy work of various kinds, these mollusks derive their commercial importance from the use of the muscle for food. Before the advent of the white man they were largely gathered for this purpose by the Indians. The principal fisheries are on the coast of Maine, in Long Island Sound, Buzzard Bay and contiguous waters, and on the coasts of New Jersey and California, the first two having the greatest magnitude. South of Cape Cod *Pecten irradians,* which has the shell marked with about 20 prominent radiating ribs on each side, is the species sought. This lives especially in the shoal waters of the bays or on flats in the Sound. Scallops vary greatly in abundance from year to year and the seat of the fisheries changes accordingly, some formerly favorite grounds being abandoned and others developed. The commercial scallop fishery of Maine originated about 1880 and has since developed into an important industry at many points east of Casco Bay. Here the giant scallop (*P. magellanicus*) is the species sought. This is much larger than *P. irradians,* and the valves are marked with numerous fine radiating lines, the lower valve being nearly flat and white and the upper convex and brown. This species lives in deeper water and like the other changes its feeding ground. Scallops are now taken almost exclusively in small dredges, resembling in most features the oyster dredge, and pulled over the ground by means of small boats; larger vessels when used serve chiefly for transportation, etc. The fishing season varies; south of Cape Cod it covers the cold months, but about Mount Desert the bulk of the catch is made during July and August.

Consult Ingersoll, 'The Fisheries Industries of the United States,' Sec. V (Washington 1887); Smith, 'The Giant Scallop Fishery of Maine'; Bulletin United States Fish Commission 1889 (1891); Stearns, *Overland Monthly* (1873); Zittel and Eastman, 'Textbook of Palæontology' (Vol. I, London 1900); Risser, 'Thirty-first Report of the Commissioner of Rhode Island Fisheries' (Providence 1901).

SCALP, the outer covering or integument of the upper part of the skull or brain-case. Except in the fact that hair in both sexes grows more luxuriantly on the scalp than elsewhere the skin of the scalp differs but slightly from ordinary skin. But besides its constituent of skin, the scalp is composed of the expanded tendon of the occipito-frontalis muscle, and of intermediate cellular tissue and blood-vessels. Injuries of the scalp, however slight, must be carefully watched, for they may be followed by erysipelas, inflammation, suppuration or pyæmia that may easily prove fatal. Prompt antiseptic dressing lessens the danger in such accidents. In the treatment of scalp-wounds no part of the scalp should be cut or torn away; and, if possible, stitches should be avoided, as plasters and bandages will generally keep the separated parts in apposition. Burns of the scalp are very liable to be followed by erysipelas and diffuse inflammation, but the brain is comparatively seldom affected in these cases. Tumors of the scalp are not uncommon, the most frequent being the cutaneous cysts popularly known as wens, and vascular tumors. Parasitic diseases also affect the scalp, and require special treatment. Catarrhal inflammation of the hair-follicle and other hair-destroying diseases result from micro-organisms. See DANDRUFF; PITYRIASIS; RINGWORM.

SCALPER, a common term in the United States applied to any person who buys railroad, theatre or steamship tickets at a discount from people unable to use them, and sells them again at an advance on the price he paid for them. Theatres and transportation companies have devised various plans to break up this trade, and in some States laws have been passed forbidding the sale of railroad tickets at cut-rate prices.

SCALPING, the act of partly cutting and partly tearing off the skin of the head, with the hair attached, of a living or a dead victim. Scalping was practised in early times, by most of the savage and barbarous nations of the eastern hemisphere, as the Scythians, Gauls and other wild peoples of Asia and Europe, and later by the American Indians residing principally in the eastern United States and the lower Saint Lawrence region. It seems to have been unknown until comparatively recent times, in the great plains regions; and it was little practised among the Pueblo and other more cultured tribes of the United States. It was unknown south of the Rio Grande except where introduced by American tribes; and was absent from Central and South America. Nor was scalping practised in the Canadian Northwest or along the whole Pacific Coast. Sometimes the entire head was taken in lieu of the scalp. After the scalp was taken, it was tanned and then stretched on a small hoop of wood, and the side opposite to that having the hair was painted in various colors, and even the hair was tinted likewise. Sometimes the portrait or the hieroglyphic device of the person scalped was placed on it. Persons scalped did not always die from the effect. Scalps were regarded as trophies of victory and prowess. Joutel relates that in 1687 among the Cenis of Texas, a scalp was waved or offered in ceremony to the four quarters of the world, and that tobacco and hominy were offered to the scalps that were paraded. In 1703, Bienville offered 10 «escus» (*écus,* about 10 crowns) for every scalp of a man killed or prisoner taken of the Chetimachas and Alibamons (Alibamas). The American colonies offered bounties for scalps. In 1724 Massachusetts offered 100 pounds sterling (about $500) for Indian scalps; 30 years later, during the so-called French and Indian war, the French offered a bounty for British scalps, and the colonists for Indian scalps. In 1755, 40 pounds sterling (about $200) was offered by Massachusetts for the scalps of male Indians over 12 years of age, and 20 pounds sterling (about $100) for the scalps of women and children.

This official encouragement to scalping led to the extension of the practice to tribes that had never before indulged in it. Naturally among these latter tribes the scalp had little or no ceremonial significance as it seems to have had among eastern tribes. Scalping appears to have probably arisen out of head-hunting which seems to have been common in parts of America at an early date. Among the tribes originally addicted to scalp-taking, a scalp dance formed a part of the ceremonies held on the return of a war party. In this dance the women, not the men, carried the scalps. The scalp was not, as popularly supposed, a standard by which to judge the powers of the warrior.

Consult Braunschweig, 'Scalping' (Smithsonian Reports 1906–07); Friederici, 'Skalpieren und ähnliche Krugsgebräuche in Amerika' (1906); Handbook of American Indians, 'Scalping' (Washington 1910).

SCALY ANT-EATER. See MANTIS.

SCAMANDER, skạ-măn'dẽr (ancient XANTHUS), Turkey in Asia, a small stream in the Troad, rising near the city of Ilion. It had two sources, one of which was hot, the other cold. Strabo asserts, however, that it had but one source, which was in Mount Ida. Its direction was west-northwest, and about two miles from its mouth it received the small river Simois; it emptied into the Hellespont. Since the beginning of the present era these rivers have had separate courses. The Scamander is sometimes identified with the Mendere or Meander (q.v.).

SCAMMONY, a gum-resin obtained from the *Convolvulus scammonia,* native to the bushy wastes of western Asia. This is a climbing plant with irregularly arrow-shaped leaves, white or purplish flowers like morning-glories, and a fleshy tapering perennial root. When in flower, incisions are made obliquely in the upper part of this root, and shells fastened below the gashes, in which the sap is caught as it exudes. They

are then emptied, the juice added to scrapings from the root, thoroughly mixed, dried, and kneaded into cakes. Scammony is much adulterated, but when pure or "virgin" is greenish-gray or blackish in color, internally porous and of a resinous lustre, breaking with an angular fracture and translucent in thin pieces. It has a peculiar somewhat cheeselike odor and an acrid taste. Different kinds of the drug are named after the districts in which it is collected and the place of export. Scammony is a strong purgative usually used in combination with other medicines, and supposed to have been known to the Greeks as early as the 3d century B.C., also to have been one of the medicines recommended by Helias to King Alfred the Great.

SCAMOZZI, Vincenzo, vĕn-chĕnd'zō skä-mōt'sē, Italian architect: b. Vicenza, 1552; d. Venice, 7 Aug. 1616. He was taught by his father, also an architect, and by Palladio and Sansovino, at Venice; and at Rome he studied ancient monuments. Returning in 1583 he was commissioned to erect a monument to the family of Marc Antonio Barbari, in the church of the Carita, and so much was this work approved that he was appointed to finish the grand library at Saint Mark's, to build the Trissino Palace at Vicenza and the Cornaro Palace on the Grand Canal, Venice. By this time Scamozzi's fame had spread over Europe and he was in great demand. He built the Ravaschieri Palace at Genoa, and added the second story to the Palazzo Strozzi at Florence (1594). About 1604 he designed the cathedral of Salzburg, Austria, and a part of the Schloss at Prague, Bohemia. His writings include 'Discourses on the Architecture of Rome' (1582); and 'Ideas of Universal Architecture,' two volumes of which were completed before his death.

SCANDERBEG, skăn'dĕr-bĕg, Albanian prince: b. 1404; d. Lissa, Albania, 17 Jan. 1468. His real name was George Castriotes, and he was the fourth son of John Castriotes, an Albanian prince. The sons being given to Sultan Murad II in 1423 as hostages of peace, the sultan named the youngest Iskender Bey (whence Scanderbeg) and made him a janissary after having poisoned his three brothers. When Scanderbeg's father died in 1432 and the sultan annexed Albania as a province, Scanderbeg determined to revolt. He had gained distinction in the Ottoman campaigns, and his opportunity came when, in 1443, he was sent to Hungary against the Christian Huniadi. He entered into agreement with the latter, gave him the victory, and fled to the sultan's powerful fortress of Croia, of which he gained command as the sultan's representative. Abjuring Mohammedanism, he now organized the Albanian forces and successfully repelled the armies of the entire Ottoman empire for 17 years, when the sultan's successor, Mohammed II, made a treaty with him acknowledging the independence of Albania and Epirus. A few years later he was persuaded by the Pope to join the Venetians against the Mussulmans and with an inferior force won eight great victories over Mohammed II.

SCANDINAVIA, skăn-dĭ-nā'vĭ-ą, a general designation for the three north-European kingdoms, Denmark, Norway and Sweden (qq.v.), sometimes applied in a more restricted sense to the two latter only. In the Middle Ages the name of Northmen was bestowed indiscriminately on the inhabitants of the three countries, whose closely related languages and common mode of life and political fortunes afforded sufficient basis for considering them one people. As a geographical term Scandinavia is rapidly passing out of use, but the appellation is still employed in an ethnographic, and especially in a literary sense.

SCANDINAVIAN LANGUAGE AND LITERATURE. See DANISH LANGUAGE, DANISH LITERATURE; NORWEGIAN LANGUAGE, NORWEGIAN LITERATURE; SWEDISH LANGUAGE, SWEDISH LITERATURE.

SCANDINAVIAN MUSIC. From the earliest known records it is evident that the music of the Scandinavian peoples was an accompaniment of songs and ballads based on the sagas, or prose epics embodying the myths and heroic tales current among their remote ancestors. The Danish 'Kalenpeviser,' the richest poetical remains of the folk-lore of the Middle Ages in Europe, consists of songs and ballads concerning giants, demigods and other supernatural creatures in Scandinavian mythology, the composition of which in the old Northern or Icelandic tongue has been referred to the 14th century. It is evident that throughout the Middle Ages the literature of Iceland was enriched with numerous national and other sagas whose subjects were drawn largely from scaldic songs. The 'Kalevala' or 'Kalewala,' meaning "the land of heroes," is the national epic of Finland. To Elias Lönrot, of Halsingfors, belongs the distinction of having rescued from oblivion many of the numerous sagas and songs which had for ages been recited by the Finnish *runolaineu,* or singers, to the sound of the *Kaultela,* or harp and thus transmitted from one generation to another. Lönrot published the results of his researches under the title of 'Kalewada' (1835), the central hero of which is Wainamaineu, the god of poetry and music. The date of the action of 'Kalewala' is referred to a period anterior to the introduction of Christianity among the Finns in the 14th century. There is strong internal evidence, from the identity of the names and traditions of the 'Kalewala' with many still current in Esthonia, that its action very probably belongs to an epoch anterior to the immigrations of the Karelians into the districts which they now occupy. Thus, in Scandinavia, the song, with known and presumed instrumental accompaniment, is traceable back for more than four centuries.

In the development of modern musical composition, Denmark, Finland, Norway and Sweden present a strong array of masters, among whom are the following, with representative works:

Denmark.— JOHAN P. E. HARTMANN (1805–90), credited with being the first Danish composer to impart a distinctively Scandinavian flavor to his music; works: overtures, symphonies, cantatas, operas; 'Ib and Little Christina,' 'The Golden Hours,' 'The Corsairs,' 'Liden Keristen.' NIELS W. GADE (1817–90), pronounced a master of instrumentation; works: chamber, symphonic and choral music; cantatas 'Zion,' 'The Crusaders,' prize overture 'Nachklänge von Ossian.' EDWARD LASSEN (1830–1904), composer of popular drawing-room songs; operas 'Fanenlob' and 'Le captif'; ballet 'Diana'; music to 'Œdipus in Kolonus,' 'Faust,' 'Pandora' and 'Nibelungen' (Hebbels). AUGUST ENNA (1860–), specialist in fairy opera based on Andersen's tales; works: 'Ib and the Little Christian,' 'The Match-girl,' 'The Witch,' 'Cleopatra,' 'Aucassin and Nicolette,' 'Gloria Arsena.'

Finland.— JEAN SIBELIUS (1865–), to whom Finland owes much of its recent musical fame; works: symphonies, symphonic poems, 'Tornissa olija impi' ('The Maid in the Tower'), the first Finnish opera; 'Korelia,' 'Finlandia,' 'Kanteleter' (collection of short lyrics), 'The Swan of Tuonela.'

Norway.— In the noted LINDEMANN family of composers, father and four sons, LUDWIG M. (1812–87) was conspicuous because of his great collection of Norse folk-songs, the treasure house of music. HALFDAN KJERULF (1818–68); works: forty 'Norske Folkeviser' ('Norse Folk-song'), 'Spring Song,' 'Shepherd's Song,' 'Cradle Song.' JOHAN S. SVENDSEN (1840–1911), violinist, court conductor at Copenhagen; works: symphonies, Norwegian Rhapsodies,' 'Zorahayde' (legend), 'Carnival at Paris,' 'Coronation March' (for Oscar II), 'Carnaval des artistes norwegiens.' RIKARD NORDRAAK (1842–66), composer of many songs that became widely popular. EDWARD H. GRIEG (1843–1907), composer and pianist, in all his work preserved his Scandinavian individuality, especially in 'Norwegische Volkslieder und Tänze' (op. 17), 'Peer Gynt' (op. 23, 46, 55), 'Elegische Melodien' (op. 34), 'Norwegische Tänze' (op. 35) and 'Popular Norwegian Melodies' (op. 66). AGATHA BACKER-GROHUDAHL (1847–1907), dean of Norwegian women composers; works: studies, sketches, songs. OLE OLESEN (1851–), works: operas, oratorios, cantatas, symphonic poems, choral songs, orchestral music, 'Asgaardsreien.' CHRISTIAN SINDING (1856–), works: 'Violin Concertos' and 'Sonatas,' opera 'Der heilige Berg,' symphonies, chamber music, piano solos, songs 'Rondo Infinito,' 'Episodes Chevaleresques.'

Sweden.— The preservation of a great mass of early Swedish folk-songs is due in large measure to two enthusiasts: ERIK G. GEIJER (1783–1847), published a collection of modern Swedish songs, another of Swedish folk-songs and a third of original songs in the old Swedish vein; ARVID A. AFZELIUS (1785–1871), published two collections of Svenska Folksvisor' ('Swedish Folk-songs') and 'Afsked of Svenska Folksharpen' ('Farewell of the Swedish Folks-harp'). Composers: FRANZ BERWALD (1796–1868), works: symphonies, chamber music, opera 'Estrella di Soria.' ADOLF F. LINDBLOD (1801–78), called "the Schubert of the North," noted for his songs made popular by Jenny Lind (1820–27), "the Swedish Nightingale"; opera 'Frondenrerna.' IVAR HALLSTRÖN (1826–), credited with the creation of the national opera; works: 'Mountain King,' 'Bride of the Gnome,' 'Vikings' Voyage,' 'Granada's Daughter.' AUGUST J. SODERMANN (1832–76), works: operettas, 'The Wedding at Ulfasa'; music to Schiller's 'Jungfrau von Orleans'; a mass pronounced his best work; concert overture, choral ballads. ANDERS HALLEN (1846–), dramatic composer; works: 'Harold der Viking,' 'Swedish Rhapsodies' (op. 17, 23), 'Vineta' (Choral rhapsody), 'Vom Pagen und der Königstochter.' EMIL SJOGREN (1853–), organist Johankirke, Stockholm; works: 'Novelletten' (op. 15), 'Steimninger' ("mood pictures," op. 20), sonatas (op. 19, 24), 'Fantasiestücke' (op. 27). WILLIAM STENHAMMER (1871–), works: operas 'Tirfing,' 'Das Test auf Solhang'; choral 'Prinsessan och Soennen,' 'Snofried'; overture 'Excelsior.' HUGO ALFVEN (1872–), works: principally symphonies and chamber music. Consult Closson, 'Edv. Gr. et la musique Scandinave' (1892); Baker, 'A Biographical Dictionary of Musicians' (1900); Riemann, 'Geschicte der Musik seit Beethoven' (1901); Soubise, 'Histoire de la Musique: Etats Scandinaves' (1901); Baltzell, 'A Complete History of Music' (1905); Niemann, 'Die Musik Skandinaviens' (1906); Stanford-Forsyth, 'A History of Music' (1916).

SCANDINAVIAN MYTHOLOGY. The mythology of Scandinavia was distinct from that of ancient Greece and Rome, although both systems resemble each other in certain essential features, and they may possibly have had a common origin in the far-off prehistoric period. The differences were such as might be expected to exist between a nation cradled in the frozen North and nations living in the genial South. In the Scandinavian, as in Greek mythology, there are two periods, the prior one apparently reflecting misty traditions of the earth's development from chaos and darkness into order and light, perhaps stories which the cave-man had handed down to his children and they to their children, until they became crystallized into an ideal system of supernatural beings by the Vikings, who afterward invaded and conquered the Scandinavian countries. Geology has strangely verified the facts which were dimly shadowed forth in the early Northern mythology. The terrible ice age which converted Europe into an arctic waste, and pushed its awful precipices into the Atlantic beyond the Hebrides and the western coast of Ireland, evidently made an indelible impression on the mind of prehistoric man, who learned to regard ice as the deadly enemy of human existence, and the sun, with its vivifying heat, as the source of happiness and joy. This thought, almost a second nature, is reflected in the earlier mythology of the Scandinavian race, in its shadowy and crude mind-picture of something that had really happened, and that, it was feared and believed, might and would happen again.

The second and younger period of Scandinavian mythology reflects a new era. Men have conquered their old dread of an ever imminent catastrophe. They had battled with nature and found themselves often victorious. They have had heroes of their own, sharing their loves and revenges, triumphing in war and enjoying the rewards of valor and virtue. Nor were their women unwarlike, as became the daughters of heroes. The Amazons, real or imaginary, of Grecian story had their counterparts in the lore of the North. A new mythology grew out of new conditions, different from, yet linked with, the old, from which it was a natural evolution, and it is with this younger mythology,

its gods and goddesses, that Christianity was brought into contact, ultimately crushing it out after a struggle which proved the deep attachment of the Northmen to their ancient faith.

It is to be said for Scandinavian mythology that it never descended to the sensuousness of Greece and Rome, and was equally superior in breadth and imagery to the absurd polytheism of Egypt. It was terrible in some of its ideals, but never depraved. It imaged the spirit of the Viking race, and was well calculated to inspire them to the deeds of prowess which brought to their feet even the militant races that had founded kingdoms on the ruins of imperial Rome.

According to the earlier Scandinavian mythology there was originally no heaven and no earth, but a vast deep, a world of mist in the North called Niflheim, a fountain which was called Hvergelmer that flowed from the mist, and 12 rivers that issued from the fountain. These rivers froze into ice and filled the deep — a picture of the ice age. The world of fire and light was in a southerly direction, and was called "Muspelheim." The light and heat from the world of fire melted the ice from the world of mist, and from the melted drops sprang the ice-giant Ymer. A little man and woman proceeded from Ymer's left arm, and a son from one of his legs, and these were the ancestors of a race of ice-giants. A cow also came into being from the ice and heat, and gave milk to the giant Ymer, at the same time keeping itself fed by licking salt blocks of ice. One evening while the cow was licking the blocks, human hair grew out of them; on the following day a head, and on the third an entire man, who was called Bure. Bor, the son of Bure, married Bestla, the daughter of the giant Bolthorn, and they had three sons, Odin, Vile and Ve. The sons of Bor slew the ice-giant Ymer. From his body they created the heaven and the earth. His flesh became earth; his bones rocks; his teeth and pieces of his jaws became stones; his hair, grass and trees, and his blood the sea and rivers. His skull was used to make the sky, which was extended over the earth, with four dwarfs, Austre, Vestre, Sudre and Nordre, representing the East and West, South and North, at the four ends. Out of the heat and light from Muspelheim they made stars, which they fixed in the heavens to give light to the earth. Ymer's brain became clouds. From two ash-trees were created a man, Ask, and a woman, Embla, who were endowed with reason, language, hearing and sight. The tree of the world called Ygdrasil, stood over the well of time, with its top above the heavens, and three great roots, one among the gods, another among the giants and the third in the lower regions. The fountain of wisdom and the sacred fountain flowed forth near the roots. By the sacred fountain the gods held their councils, and from this and the fountain of wisdom sprang three beautiful maidens, the Norns, similar to the Fates of Greece and Rome. The Norns were Urd (the Past), Verdande (the Present) and Skuld (the Future). The Norns decreed the fate of men and gave them aid or punishment as they deserved. The gods dwelt in Asgard, in which was Gladsheim, the hall of gladness. The giants dwelt in Jotunheim and men in Manheim.

Nature-worship came in more distinctly with the latter Scandinavian mythology. Odin, ruler of the universe, the Jupiter of the North, and his wife, Frigg, have for sons Thor, the god of thunder, and Balder, the god of justice and of eloquence; and Balder is father of Forsete, god of harmony. Njord, god of winds and of commerce, is father of Frey, who gives rain or sunshine, abundance or famine, to mankind, and of Freyja, who is goddess of love, but also, far different from the Grecian Venus, a model of womanly goodness and wifely devotion. Other gods and goddesses there are, most of them beneficent, and representing the better qualities of heart and conscience; all of them superior to the generally dissolute throng of immortals who sat in the court of Olympus when they were not engaged in some intrigue on earth.

The system was not without its terrors, however, its monsters who personified evil and presided over the doom of those debarred from happiness above. The malignant Loke was father of Hel, goddess of the infernal regions, and from whom is derived the name by which they are designated in the English tongue. She dwelt in Helheim, the hall of grief, with hunger for her table and disease for her bed. There the prisoners of fate led a dark and cheerless existence, in marked contrast to the delights of Asgard.

Scandinavian mythology dealt also with the future of the world and of humanity, and here again it is remarkably in accord, in some of its features, with the teachings of science, and it may be added also of religion. Heaven and earth are to pass away. The end will be preceded by great wars, severe winters, destructive storms and a covering of the face of the sun. The wolf Fenrer will devour the earth and giants will make an attack on heaven. The gods will perish. Then there will be a new sun; the earth, rescued from the jaws of Fenrer, will exist again, and a human pair, saved from the general destruction, will renew the human race.

Such was the faith of the fathers of that race which settled Normandy and conquered England, which gave rulers to Muscovy and Sicily, and guardians to the degenerate heirs of the Constantines — the race from which the English-speaking peoples of to-day are largely descended, and from which some of their most valuable qualities are derived.

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SCANDIUM, in chemistry a rare metallic element discovered by Nilson (1879) in the mineral euxenite; symbol Sc; atomic weight 44.1. It is of special interest because its existence and properties were deduced theoretically by Mendeleef from his periodic system of the elements. He called the to-be-discovered element ekaboron. As Nilson's scandium showed exactly the same atomic weight and chemical properties foretold by Mendeleef it is a further proof of the value of the Mendeleef hypothesis. Scandium occurs in very small amounts in the minerals euxenite, gadolinite and yttrotitanite. It forms a white oxide Sc_2O_3 and a number of salts related to the same. The salts are colorless and have a rather acid astringent taste.

SCANLAN, Lawrence, American Roman Catholic bishop: b. Tipperary, Ireland, 28 Sept. 1843; d. 10 May 1915. He was educated at All Hallows College, Dublin, where he was ordained priest in 1868. Coming to America, he was assistant at Saint Patrick's, San Francisco, Cal., 1868 to 1870 and at Saint Mary's Cathedral in that city for the two years following. In the end of 1871 he was sent to Pioche, Nev., where he built the first church in the section; in 1872 to Petaluma, Cal.; in 1873 to Salt Lake City, Utah, where he was first pastor for Utah Territory and then vicar forane. He was so successful in his management of church finances in Salt Lake that he cleared the church of debt and raised a sum sufficient to purchase a large tract of land, on which he built an academy. This kind of work he followed until 1887, building churches and schools, and in 1886 founding the college of All Hallows in Utah. On 25 Jan. 1887 he was appointed bishop of Lavenden, *in partibus* and apostolic vicar of Utah. On 29 June 1887 he was consecrated at Saint Mary's Cathedral, San Francisco, by Archbishop Riordan, assisted by Bishops O'Connell and Manogue. He became the first bishop of the diocese of Salt Lake, Utah, 30 Jan. 1891.

SCANNELL, Richard, American Roman Catholic bishop: b. Cloyne, County Cork, Ireland, 12 May 1845; d. 8 Jan. 1916. He was educated at the College of Middleton, Cork, and at All Hallows College, Dublin, at which latter place he was ordained priest, 26 Feb. 1871. He came to the United States the same year and was appointed assistant in Saint Mary's Cathedral, Nashville, Tenn. He served successively at Saint Columba's Church and as pastor of Saint Mary's Cathedral, 1871–85, being administrator of the diocese of Nashville, 1880–83; and as pastor of Saint Joseph's Church, West Nashville, which he organized, 1885–87. On 9 June 1887 he was appointed bishop of the diocese of Concordia, Kan., and was consecrated in Saint Mary's, Nashville, 30 Nov. 1887, by Archbishop Feehan, assisted by Bishops McCloskey and Rademacher. Upon the death of the Rt. Rev. Jas. O Connor he was transferred 30 Jan. 1891 to the diocese of Omaha.

SCANSORES, skăn-sō'rēz, an obsolete order of birds represented by cuckoos, woodpeckers, parrots, toucans and trogons, and the like, popularly known as that of the "climbing" birds, and distinguished primarily by the fact that the toes are directed two forward and two backward. It was an artificial group, whose members have been scientifically re-classified in the *Coraciiformes* and other groups, and are also known as *Zygodactylæ,* from the arrangement of their toes. Compare NATATORES.

SCAPA, an abbreviated designation for the London organization known as the Society for Checking the Abuses of Public Advertising, the purpose of which is the elimination of advertising displayed on boardings and other prominent places to the disfigurement of both towns and rural scenery. The society endeavors to reach its ends through both legislation and awakening public interest in its crusade.

SCAPE-GOAT, a goat which according to the Mosaic law was sent into the wilderness, on the Day of Atonement, bearing the sins of the people (see Lev. xvi, 1–6; Matt. xii, 43; Luke xi, 24). Under later Jewish practice the goat was thrown over a precipice about 12 miles from Jerusalem. Hence the term "scapegoat" is applied to any person who is made to suffer for the wrongdoing of others.

SCAPHOPODA, a class of *Mollusca* of a low type, known as fossils from the Devonian to the present, and surviving in only a small number of forms, typified by the tusk-shells (*Dentalium*). The head is rudimentary, the mantle-edges ventrally concrescent, forming a tube opening before and behind, and covered with a slight-curved shell shaped like an elephant's tusk. The body has its dorsal side toward the concave side of the shell, and is attached to the shell by muscles near the posterior or pointed end. The foot, which can be protruded from the anterior or wider aperture, is rather long, pointed and has sometimes two lateral lobes. All are marine, and some species live in very deep water. Consult Cooke, 'Mollusca' (London and New York 1895).

SCAPOLITE, the name of an important group of rock-forming minerals, including the species meionite, wernerite, mizzonite, marialite. Of these minerals wernerite (q.v.) is by far the commonest. All the species of the group crystallize in the tetragonal system and are hemihedral. Their color is generally white, gray or flesh-red; hardness, 5 to 6.5; specific gravity, 2.57 to 2.74. They are all silicates of aluminum, calcium and sodium; chlorine is also often present. Their composition has been explained by Tschermak by placing meionite at one end of the series with a typical formula of $Ca_4Al_6Si_6O_{25}$ and marialite at the other end with a typical formula of $Na_4Al_3Si_9O_{24}Cl$, and assuming that wernerite and mizzonite are isomorphous combinations of these two compounds in varying proportions. The scapolites are thus an interesting group of minerals similar to the feldspars in their formation of a series of compounds gradually varying in composition, the silica, soda and chlorine increasing as the alumina and lime decrease. Scapolites occur abundantly as primary minerals in Archæan rocks in limestone and gneiss; meionite occurs in the volcanic rocks of Vesuvius, but with this exception, the scapolites occur in eruptive rocks only as secondary minerals, being products of the alteration of feldspars.

SCAPULA. See ANATOMY; OSTEOLOGY; SHOULDER-JOINT.

SCAPULAR, or SCAPULARY, an article of attire worn over the shoulders (*scapulæ*) by the inmates of monastic houses. Originally, in the Benedictine Order, it was worn over the regular monastic dress by the brethren when engaged in manual labor, but it is now part of the ordinary habit of the older religious orders, whether of monks or of friars. The word, however, is now commonly used to signify a sort of emblematic scapulary, consisting of two small squares of cloth held together by strings, from which the pieces of cloth are suspended so that one square reaches to the breast and the other to the back at the shoulder blades of the devotee who wears the scapular. There are several different kinds of these scapulars, to the wearing of which are attached sundry obligations and sundry spiritual privileges, such as indulgences, participation in the merits and the prayers of their fellow-members of a scapulary confraternity, etc. These miniature scapulars were brought into use in the 13th century by Saint Simon Stock, an Englishman and general of the Carmelite Order.

SCAR-TATTOOING. See TATTOOING.

SCARABÆIDÆ, skăr-ī-bē'ī-dē, an exceedingly large family of beetles, including the most gigantic forms, although some of the species, as the chafers, dung-beetles, etc., familiar in the United States and Europe, are of moderate or small size. The terminal segments of the antennæ are composed of flattened plates, producing comb-like clubs. Unlike those of their relatives, the *Lucanidæ*, these plates can be brought closely together so the club appears compact. These plates are relatively larger in the males than in the females. The pronotum, especially in the males, is often ornamented with conspicuous and curiously shaped horns whose purpose is unknown as in the rhinoceros beetle. In structural detail and habits the members of this family differ widely among themselves. Some feed on manure. Certain American species roll together balls of dung wherein they lay their eggs, thus providing food for their grubs. Very many feed on plants, the beetles eating leaves; the larvæ the roots. The grubs are white and fleshy, usually bent into a semi-circle; the large head has powerful mandibles and no ocelli; the body-segments are often transversely wrinkled, and the hindmost segment is often greatly swollen. Some of the adult *Scarabæidæ* are dull black — the dung-beetles for example; while others are of bright metallic hues. The family ranges all over the world, but is most abundant in tropical countries. Several species are serious pests; for instance, May beetles or June bugs the larvæ of which feed on grass roots and when numerous destroy pastures and lawns and rose beetles, the adults of which destroy roses, grapes, etc. Rotation of crops eliminates the pests, and spraying with extra strength, sweetened arsenate of lead as an insecticide is one of the best preventives to control the scourge. A typical example of the group in the sacred beetle of Egypt (see SCARABS), whose carved images are called scarabeids.

SCARABS, representations of the sacred beetle found on Egyptian gems, coins, mummies, obelisks, and works of art. The appearance and rapid multiplication of beetles in the mud on the subsidence of the Nile gave rise to the belief in their spontaneous generation, and they became the symbol of creation and creative power. Their circular shape and the bright, golden tints of their wing-cases suggested the shape and lustre of the sun. Thus they were taken to be one of the forms under which the sun-god appeared. Accordingly, scarabs were cut in stones and employed as seals and amulets, and after being bored through lengthwise were strung like beads, and easily worn on the person. After the commingling of the Egyptian with other races, Gnostics and Christians interpreted the meaning of these gems in accordance with their own religious systems. Those of the most ancient period, such as are found on mummies, are inscribed with the names of the kings held in highest veneration, Thutmosis III, Rameses II, and Amenophis III, and frequently with some hieroglyphic symbol. The larger of them have some short religious or historic inscription on their under side.

SCARAMOUCH, skăr'a-mowch, term derived from Scaramuccia, a famous Italian buffoon, who acted in England in 1673, and died in Paris in 1694; applied to one of the grotesque characters of the Italian stage, who was dressed entirely in black, wore a mask, and represented the swaggerer and poltroon. In France the scaramouch was used for a greater variety of parts.

SCARBOROUGH, skăr'bŭ-rō, **John,** American Protestant Episcopal bishop: b. Castlewellan, Ireland, 25 April 1831; d. Trenton, N. J., 14 March 1914. He came to the United States when very young, was graduated from Trinity College, Hartford, in 1854, from the General Theological Seminary in 1857, and was ordained to the priesthood in 1858. He was assistant rector of Saint Paul's, Troy, in 1857–60, rector of the Church of the Holy Comforter, Poughkeepsie, N. Y., in 1860–67, of Trinity Church, Pittsburgh, Pa., in 1867–75, and in the last-named year was consecrated bishop of New Jersey, where he remained until his death.

SCARBOROUGH, William Sanders, American educator: b. Macon, Ga., 16 Feb. 1852. He was graduated from Oberlin in 1875, studied at the Theological Seminary there, and later occupied various chairs at Wilberforce University, of which he was vice-president 1895–1908, and then became president. He is of African descent and is actively interested in the education and uplifting of his race. His publications include 'First Lessons in Greek' (1881); 'Our Political Status' (1884); 'Birds of Aristophanes' (1886), etc. He was an authority on Hellenistic and Classical Greek, negro folklore, and philological and archæological subjects.

SCARBOROUGH, England, in the county of York (North Riding), popularly known as "The Queen of English Watering Places," is on the North Sea, 39 miles northeast of York. The main part of the town is on the south bay, and rises in successive terraces; the new quarters are divided from the older by a deep ravine crossed by two bridges. The modern period of the town dates from the discovery of mineral springs in 1620. The Grand Hotel, on Saint Nicholas Cliff, is one of the largest in England. There is a fine aquarium, a museum

— a Roman Doric rotunda — a mechanics' institute, and the Spa and its grounds are attractive features of the place. There are fine promenades. The People's Park occupies both sides of the valley. Fishing and the manufacture of jet ornaments are the chief occupations. The castle erected about 1136 was held against the Barons by Piers Galveston, and it was twice besieged by the Parliamentary forces. Later it became a fortified barrack. In 1914 it was bombarded with a loss of civilian life by a German squadron. Pop. 37,000.

SCARBRO, W. Va., town situated on the Chesapeake and Ohio and Virginian railroads. The chief industry is coal mining, the famed New River smokeless coal being produced here. The value of the town's taxable property is $400,000. It contains a 10-room graded school. The annual receipts and expenditures average about $2,000. The town is situated at an altitude of 1,800 feet and was named for the English town of Scarborough. Pop. 5,000.

SCARECROW, The. The prolific pen of Percy Mackaye has never turned out a more satisfactory drama than this, called by him "a tragedy of the ludicrous." It is clearer in its philosophical purpose, more skilful in its dramatic treatment, more direct in its human application than anything he has yet done. When it was given in New York, at the Garrick Theatre, on 17 Jan. 1911, with the excellent support of Frank Reicher, as Ravensbane, and Edmund Breese, as Dickon, a Yankee improvisation of the Prince of Darkness, it met with the cordial recognition it deserved. Were repertory the fashion at the present day (1919) in the American theatre, it would occupy a worthy place among the plays for constant revival.

The inspirational source for 'The Scarecrow' is Nathaniel Hawthorne's 'Feathertop,' a tale included in his 'Mosses from an Old Manse'; Mr. Mackaye acknowledges his dependence on the story for the main ideas of his plot. But he writes an introduction to the printed play, showing the main details in which he and Hawthorne differ. These may be summed up briefly: Hawthorne's Scarecrow "is the imaginative epitome or symbol of human charlatanism," the satire being aimed against fashionable society. Mr. Mackaye stretches his philosophy to wider application. His Scarecrow, Ravensbane, is the "emblem of human bathos." Are we not all more or less human scarecrows, composed of rubbish, out of which we have to hew our own salvation? When Dickon and Goody Rickby construct a scarecrow, and breathe into him, by their devilish magic, the breath of life, symbolized by the glow of a pipe, which keeps Ravensbane alive, they do so in order to wreak vengeance on the old justice, Gilead Morton. But they give no thought to the tragedy which might befall a scarecrow thus thrust upon the world and subject to human experience. They do not realize that when, at the end, in love with the justice's niece, Ravensbane looks into the magic mirror, which reveals people as they really are, he will see himself as a scarecrow, and the tragedy of the ludicrous, so entertaining to the onlooker, will fall heavily on his own poor pumpkin head.

"What absurdity is our highest consummation!" writes Mr. Mackaye; "Yet the sense of our highest deficiency is, after all, our salvation. There is one reality which is a basic hope for the realization of those dreams. This sense is human sympathy, which is, it would seem, a more searching critic of human frailty than satire. It is the growth of this sense which dowers with dignity and reality the hollowest and most ludicious of mankind, and becomes in such a fundamental grace of character."

Where Hawthorne ends, therefore, so Mackaye claims, his play begins; where Hawthorne's shafts hit charlatanism, he mingles human sympathy with irony, and there is for Ravensbane, the scarecrow, the same feeling of pity that one feels, now and again, for Don Quixote. In his object the dramatist succeeds well. With the result that 'The Scarecrow' may be accounted a good drama, admirably fulfilling its purpose, and admirably reflecting New England temperament of the early witchcraft days.

MONTROSE J. MOSES.

SCAREY CREEK, Engagement at. On 2 July 1861 General McClellan, then preparing to advance from Buckhannon against the Confederate forces under General Garnett at Rich Mountain, ordered General Cox to move with one brigade from Camp Dennison, Ohio, cross the Ohio River at Gallipolis, and operate in the Kanawha Valley, the object of the movement being to secure McClellan's right flank and to prevent General Wise from reinforcing Garnett at Rich Mountain. With three regiments Cox arrived at Gallipolis, where he was joined by another regiment, and on the 10th crossed the river to Point Pleasant, where he received orders from McClellan to drive Wise from the Kanawha Valley. Cox went up the Great Kanawha on steamboats, and at the mouth of Scarey Creek, on the south side of the river, found his passage disputed by a force of 200 men, with two guns, under command of Colonel Patton. It was necessary to dislodge Patton, whose two guns commanded the river. A small body of Cox's command had reconnoitered the position, and awaited the arrival of Cox's main body, which came up on the 16th. Cox landed on the north side of the river, and on the 17th Colonel Lowe, with the 12th Ohio, two companies of the 21st, and some cavalry, in all 1,020 men and two guns, was landed on the south side of the river and advanced upon Patton, reaching the bank of the creek about 3 P.M. The two guns were put in position and the cavalry advanced, but were speedily driven back by the Confederate guns. The artillery now opened on both sides and, after some sharp firing, Patton's men were seized with a panic; but reinforcements coming up, they were rallied, and the Confederates advanced and took position along the bank of the creek, across which there was quite a severe contest. A small Union force was sent across the creek to turn the Confederate left and seize their guns; but, not waiting for this movement to develop, the main body charged across the creek and drove the Confederates up the hillside, back upon their guns, and another panic ensued. But more reinforcements coming up, the Confederates rallied and poured such a telling fire into the advancing Union line that it fell back in

disorder, leaving dead and wounded on the field, recrossed the creek, and continued the retreat. The Union loss was two officers and 12 men killed and 47 men wounded; the Confederate loss one officer and four men killed and nine wounded. Two colonels, a lieutenant-colonel, and two captains of Cox's command, whose regiments were not engaged, but who were led by curiosity to see a fight, left camp on the north side of the river and were taken prisoners. This check delayed Cox's advance up the river several days, until he could get land transportation. Consult 'Official Record' (Vol. II).

SCARIDÆ, a large family of fishes, represented by the parrot-fishes, which occur in all warm seas, lingering about coral reefs and weedy rocks. Few species are of any value as game or for food, but some are utilized in the West Indies and Hawaii. See ICHTHYOLOGY.

SCARLATINA. See SCARLET FEVER.

SCARLATTI, skär-läa'tē, **Alessandro,** Italian composer: b. Trapani, Sicily, 1659; d. Naples, Italy, 24 Oct. 1725. Appointed maestro di capella by Queen Christina of Sweden, he wrote his first opera for performance in her palace. He produced his first oratorio 'I Dolori di Maria sempre Vergine,' in 1693, and was then appointed maestro di capella to the viceroy at Naples. He held the position of chapel-master at Santa Maria Maggiore, Rome, 1707–09, and then returned to Naples. Scarlatti was possessed of great fertility of imagination. In method he opposed the enemies of the counterpoint, being considered the greatest contrapuntist of his age, and the inventor of accompanied recitative. His compositions, few of which have been published, included 115 operas, 200 masses, 9 oratorios, 500 cantatas, and miscellaneous minor pieces. Three of his operas, 'Geroue'; 'Il Flavio Cuniberto'; and 'La Teodora Augusta,' preserved in the original manuscripts, are at Christ Church, Oxford, England, and another is in the British Museum.

SCARLET FEVER, or **SCARLATINA,** an acute infectious disease, the specific cause of which has not yet been discovered (1919). The disease is characterized by a rapid onset of fever, general symptoms of poisoning, and later by the appearance of a typical rash. The disease was not definitely described until the latter part of the 16th century, although an occasional case is suggested in literature before that time. Epidemics ravaged Europe for 150 years before the disease made its appearance in America; this was in Massachusetts in 1735; and the disease then spread all over New England and the rest of North America. Not until 1830 did it get a foothold in South America, but since that time epidemics have been widespread and frequently very malignant.

In spite of laborious researches, the causative agent has as yet eluded detection. The disease is transmitted directly from one individual to another, or through articles which have been in the sickroom, such as clothing, bedding, paper, pictures, and particularly those substances from which infectious material is not readily dislodged. The virus is not killed by cold, but dry heat, steam and gasses such as formaldehyde or chlorine are thought to destroy it after a comparatively short exposure to their action. It is doubtful if this is true. The contagion is given off in the discharges of the nose and throat, in the vomit, in mother's milk and in the desquamated skin. It may also be carried in the milk-supply, as animals are liable to the disease. It occasionally happens that the disease is transmitted before the appearance of the rash, but the most contagious period is after the onset of desquamation. The young are particularly liable to the disease. One attack usually protects the individual for life.

The period of incubation lasts from two to seven days, and occasionally longer. The onset is usually sudden and active, the patient appearing very sick and dull, complaining of sore throat and general pains througout the body. Severe and persistent vomiting ushers in the attack. The temperature rises rapidly, reaching 103° or 104° F. in the first 24 hours. These symptoms constitute the prodromata, lasting from 12 to 36 hours; at the end of which period the rash appears, first on the front of the neck and chest, and gradually spreads over the entire body in two or three days. This rash is a diffuse blush of brilliant scarlet hue, showing tiny elevations of a deeper color scattered through the general redness. The temperature and severity of the disease increase until the rash is all out, then gradually subsides, the temperature reaching normal about the 10th day. The tongue shows similar elevations to those described on the skin, and hence is described as "strawberry tongue." The throat presents a general intense redness of the pharynx, palate and tonsils, with sometimes small white spots, or considerable patches of false membrane of a pearly white appearance. Desquamation begins about seven days from the appearance of the rash, and the parts that are first affected are the first to desquamate. The process continues until the entire skin of the body is shed. At first the desquamation is in the form of tiny particles, but after it has continued for a few days the skin begins to peel off in large flakes, sometimes even the entire skin of the hand or foot being shed in one piece. This process is not completed in less than 10 days, and may take over six weeks, the skin between the toes and fingers being the last to peel. There may be an entire second desquamation, but it is doubtful if this ever carries contagion. The popular belief that the disease is more serious to adults than to children does not seem to be warranted by the observation of eminent authorities.

The complications of scarlet fever are common and frequently very serious. From the throat germs may pass through the Eustachian tubes to the ears, causing inflammation there. The lymphatic glands of the neck may be enlarged by the poison passing through them, and sometimes they suppurate. Inflammation of the joints having all the characteristics of rheumatism is very common; and affections of the heart may follow this rheumatic complication. There is probably more or less affection of the kidneys in all but the very mild cases, but in some the inflammation of the kidney structure is so severe that the picture of acute nephritis is paramount. (See KIDNEYS). From such inflammation the patient may entirely recover, being left with normal kidneys, or he may succumb because of their impairment; or, again, the kidneys may be left permanently changed; this last condition being particularly apt to occur when the inflammation sets in late in the disease or during convalescence. Ordinary cases of scarlet fever are seldom fatal if the complications referred to are absent.

The diagnosis, before the appearance of the rash, is suggested by the rapid onset of the symptoms, the intensely red throat, and the persistent vomiting. The prolonged period of fretfulness, watery eyes and running nose of measles does not occur in scarlet fever; and, differing from that of scarlet fever, the desquamation of measles is bran-like. If a membrane is formed in the throat, it may be necessary to resort to bacteriological examination to distinguish between diphtheria and scarlet fever. There are many drugs which may cause a rash, closely resembling that of scarlet fever; among them, carbolic, benzoic, boracic and salicylic acids, salol, alcohol, antipyrin, phenacetin, arsenic, mercury, potassium chlorate, quinine, sulphonol, belladonna, hyoscyamus, copaiba, cubebs, rhubarb, strychnine and various ptomaine poisons. The rash caused by these substances comes out very quickly, and usually is of very short duration, while differentiation is also made by the absence of constitutional symptoms or the peculiar symptoms of the drug.

The malignant types of scarlet fever have sometimes characterized entire epidemics, but they are now rarely seen. Such cases are seen from the start to be very serious, being attended with high fever, rapid and feeble pulse, intense and persistent vomiting, headache, delirium and coma, death ensuing in two or three days.

Treatment.— As scarlet fever is self-limiting and no specific remedy is known that in any way reduces the virulence of the intoxication, reliance must be placed on careful nursing of the patient, constant watch to ward off complications, measures for the relief of such complicating inflammations as do develop and scrupulous efforts to prevent the spread of the disease. Since isolation must be continued for six weeks at least it is important to select a bright, sunny room, if possible, having an open fire. The patient is kept in bed for at least two weeks, commonly much longer. The vomiting is relieved by small pieces of cracked ice; the throat is sprayed twice daily with a mild antiseptic, such as boric acid; the patient is bathed with lukewarm water if the temperature is high, but antipyretic drugs are best avoided. After desquamation begins the entire body is covered daily with a simple ointment to favor it and to diminish the possibility of the contagion being carried. For the first four weeks of the disease the diet consists entirely of milk, but careful watch must be kept of the kidneys, as their impairment may demand a longer continuance of that diet. Not until the lapse of six weeks at least is the patient allowed to go out of doors, and not then if the weather be inclement. To prevent the spread of the disease, thorough disinfection of the sickroom and all of its contents is essential. The patient is thoroughly washed with a solution of corrosive sublimate, then removed to another room to be dried and dressed. The mattress is wrapped in wet cloths, removed from the house, and preferably destroyed. Everything that has been left in the sickroom should be disinfected with solutions of antiseptic property, or subjected to the action of steam in a closed chamber. The wall paper should be scraped off, and the walls, ceiling and floor washed with a strong solution of corrosive sublimate, a mop or a loaf of bread being used. Formaldehyde gas is then to be generated in the room for 10 hours, after which the windows are left wide open for several days.

SCARLET GRAIN, a dye-stuff consisting of coccid insects allied to cochineal. See COCCUS.

SCARLET IBIS. See IBIS.

SCARLET LETTER, the first and by general consent the greatest of Nathaniel Hawthorne's four chief romances, was originally planned as a short tale, and was expanded to its present proportions on the urgent advice of the author's friend and publisher, James T. Fields. When, with the change of administration in 1849, Hawthorne was removed from the surveyorship of customs at Salem, he undertook a collection of short pieces that might have borne to the custom-house, where he had worked, the same relation that his preceding collection had borne to the Old Manse, where he had lived. An introductory sketch, 'The Custom-House,' written for this collection, is always prefixed to 'The Scarlet Letter,' though it has no real connection with the romance, and though it contains some unfortunate personalities which show the writer's ill-temper over the loss of his position. The account in this sketch of the finding of a moth-eaten embroidered "A" and a manuscript in the upper rooms of the custom-house is of course fanciful. Years before, in the tale of 'Endicott and the Red Cross,' Hawthorne had made incidental mention of a woman who was forced to wear a scarlet "A" in token of her guilt, and the thought of this punishment, or rather of its effect on the wearer, seems to have remained with him until it resulted in the creation of Hester Prynne. 'The Scarlet Letter' was published in the spring of 1850, and instantly won for the author a recognition that had been denied to the delicate and finished shorter tales of his earlier collections. Its reputation in America has increased rather than diminished with time, and it has been warmly praised in England. In other countries it is less known, perhaps partly because many of its effects are too subtle for translation, partly because the peculiar New England quality is not readily appreciated by those of another race. 'The Scarlet Letter' is in every way typical of Hawthorne. The background is colonial New England, and the theme is the effect of a great sin on the four persons most concerned — Hester Prynne, who wears the scarlet letter, her paramour, the wronged husband, and the child who is the offspring of illicit love. When the tale opens, the sin is a thing of the past, and the judgment of the law has been imposed. The author passed by the story of love, temptation, yielding, and discovery, and beginning where another novelist might have ended he traced the moral and spiritual tragedy which followed. Even in the handling of this material he made no use of the ordinary devices of the story-teller. Thus, the identity of the guilty man, which might have been so treated as to arouse curiosity and then revealed with startling effect, is allowed to transpire quietly. The chief contrast is between Hester, who suffers

openly, and her partner in guilt, who maintains his honorable position in the community unsuspected; and the lesson which is most likely to be drawn is that of the virtue of open expiation, and the evil of concealment, even where there seem to exist the strongest arguments against confession. In the author's own words, «Be true! Be true! Be true! Show freely to the world, if not your worst, yet some trait whereby the worst may be inferred!» A secondary moral, the deadening effect of a secret and long-continued plotting for revenge, as seen in the husband, Chillingworth, is almost too obvious. Yet 'The Scarlet Letter,' while it is sure to stimulate thought, is not in any sense a preachy book. The reference in the conclusion to Hester's belief in «a new truth» which should «establish the whole relation between man and woman on a surer ground of mutual happiness,» is somewhat perplexing, but has probably been taken by radical social reformers more seriously than the author intended. Throughout the book the thought of the scarlet letter, both as a material object and as a symbol, is everywhere present, and is woven into the tale with even too great ingenuity. It is personified in the child, Pearl; it seems to imaginative observers to be flashed in the heavens by the track of meteors; and as we are led to believe, it was burned in penance on the breast of the guilty man. The background, the characters, like the demented witch-sister of the governor, the incidents, and the motive unite to sustain throughout the romance a uniform tone — sombre, tragic, unbroken from first to last by a trace of humor, and still neither morbid nor repellant. It would have been a great achievement to tell such a story for the select few who are fond of subtle psychological analysis; it is marvelous that Hawthorne made a tale, in which nothing outward happens, appeal to the mass of readers who are accustomed to demand constant action.

WILLIAM B. CAIRNS.

SCARLET TANAGER. See TANAGER.

SCARLETT, SIR **James Yorke,** English soldier: b. 1799; d. December, 1871. He was educated at Eton and Cambridge, entered the army, and in 1854 was sent to the Crimea in command of the heavy brigade. On the 25th of October he led the brigade in its famous charge at Balaclava, and later in the day it brought out of action the remnants of the light brigade after its even more famous charge. In both of these actions Scarlett took a prominent part in the hand-to-hand conflict. For these services he was promoted to the rank of major-general, on 12 December following, and upon the retirement of Lord Lucan took command of the entire cavalry forces in Crimea. In July 1855 he was created a K.C.B. He commanded the camp at Aldershot 1865–70, and retired from active service in the last-named year.

SCARP. See FAULT; also ESCARPMENT.

SCARPA, skär'pä, **Antonio,** Italian anatomist: b. Friuli, Italy, 13 June 1747; d. Pavia, Italy, 31 Oct. 1832. He studied medicine at Padua, in 1772 was appointed professor of anatomy at Modena, and published in that year his first work on the anatomy of the ear, 'Anatomicæ Observationes de Structura Fenestræ rotundæ Auris.' In 1783 he resigned this chair to accept a similar one at Pavia, where he published his great work, 'Anatomicæ Disquisitiones de Auditu, etc.' (1789). At the time of the revolution in Italy he was deprived of his professorship in the university on account of refusal to take the oath required by the Cisalpine republic. He now published his celebrated work on 'Aneurisms' (1804). When Napoleon, after his coronation as king of Italy, arrived at Pavia (1805), and received the officers of the university, he inquired after Scarpa. He was informed that he had long ceased to be a member of the university, and was told the reason. «What,» said Napoleon, «have political opinions to do here? Scarpa is an honor to Pavia and to any dominions. Let him be honorably restored.» Scarpa was the author of several other surgical works besides those already mentioned. Most of his works have been translated into English and French.

SCARPANTO, skär'pän-tō (ancient CARPATHOS), a Turkish island of the Mediterranean, 28 miles southwest of Rhodes. It is 27 miles long by six miles wide, is rocky and mountainous, and has four harbors, two on the east, one on the north and one on the southwest side, known respectively as Port Pernesi and Port Avdemo, Port Skomaco and Port Grato. There are indications pointing to a former dense population, as judged from the numerous ruins of towns. Pop. 5,000.

SCARRON, skä-rôn, **Paul,** French author and playwright: b. Paris, France, 6 July 1610; d. there, 6 Oct. 1660. Refusing to take orders he led a wild life in Paris and in Rome, to which city he went in 1634. Shortly after his return to Paris in 1637 he was stricken with an illness which left him a paralytic for the rest of his life. His mind was not affected, however, and he made his livelihood by literature. At one time he was the pensioner of the queen, but losing his pension through the influence of Cardinal Mazarin, he then wrote in revenge his satirical 'Mazarinade' (1649), one of his best-known works. He married in 1652 the young and beautiful Francine d'Aubigne, afterward Mme. de Maintenon. Both before and after this event, which Scarron survived eight years, his house was the centre of a brilliant literary society. The most famous of Scarron's writings in his own time is said to have been his 'Virgile Travesti' (1648–53), but modern critics prefer his 'Roman Comique' (1651). There have been many editions of his works; the best are those published in Amsterdam (10 vols., 1737) and reprinted at Paris (7 vols., 1786).

SCARZONERA, a genus of composite plants with numerous species, chiefly indigenous to the Mediterranean regions. The flowers are yellow or rarely rose-colored, having many series of involucral bracts, plumose and unequal pappus, and achenes without a beak and generally wingless. *S. hispanica,* sometimes known as viper's grass, has long been cultivated for its tapering, fleshy, edible roots, the dark-brown skins of which have caused it to be called black salsify. The leaves are long and lanceolate with waving edges. Other species are also cultivated for their roots.

SCAUP, skâp, or **BLACKHEAD DUCK,** a duck (*Aythya marila*), of the same genus as the redhead (q.v.), which it closely resembles in form but from which the green-glossed black head of the male and the white face of the female distinguish it. It is a very abundant duck about the shores of the North Atlantic, frequenting the sounds, bays and estuaries of the United States to Central America in winter and in the spring passing northward and inland to breed. On the coasts of the New England and Middle States the scaup is most abundant during the fall migration, occurring in flocks which feed chiefly upon small mussels and other marine animals, especially mollusks, secured by diving.

A closely related species is the lesser scaup duck (*A. affinus*), which is almost an exact smaller counterpart of the blackhead, except that the head of the male is glossed with purple instead of green and the length is about 16 instead of 18 inches. This species regularly consorts with the larger scaup and is altogether similar in distribution and habits. Both species are shot in large numbers by sportsmen and market gunners and regularly sold in the markets, but the flesh is rather coarse and strong-flavored.

SCELIDOTHERIUM. See MEGATHERIUM.

SCELOPORUS, sē-lŏp'ō-rŭs, a genus of lizards of the family *Iguanidæ,* to which the Florida chameleon (*Anolis*) and the horned toads (*Phrynosoma*) also belong. Among its kindred, this genus is distinguished by its imbricated keeled scales, the absence of a dorsal crest, of gular folds or a gular sac and of head-spines. The tympanum or ear-drum is exposed between the small scales of the side of the head; the tongue is fleshy and shaped somewhat like an arrowhead; teeth are confined to the jaws and have trilobate summits. Femoral pores, the secretion of which assists the sexes in mating, are well developed. Between 30 and 40 species of this genus are known, all of them American and most of them confined to Central America, Mexico and the southwestern United States. In this region these lizards are exceedingly abundant and are everywhere conspicuous objects. They are chiefly terrestrial, but many of the species also live upon stone walls or fences or run up tree trunks when alarmed. Their food consists of insects, which they seize with the greatest agility. In temperate regions they hibernate in cold weather. The males are generally ornamented with bright colors on the under parts which may be considered to be secondary sexual characters. The eggs, which have a parchment-like shell hardened with lime, are usually retained in the oviducts until the young are partly or wholly developed; when deposited, holes in the ground, decayed stumps, etc., are utilized for their concealment. As in many other lizards, the tail is easily broken along an unossified plate across the body of the vertebræ, after which it regenerates, but always imperfectly. The only eastern species is the common swift or fence-lizard (*S. undulatus*). Consult Cope, 'The Crocodilians, Lizards and Snakes of North America' (United States National Museum, Washington 1900).

SCENES OF BOHEMIAN LIFE, The, by Henri Murger (1822–61), though published at the beginning of his literary career (they began to appear in the periodical press in 1847) mark the highest point in his achievement. His poetry (he always believed himself a poet) has not stood the test of time, and his later novels are outranked by their predecessor. This suffices, however, to give him his place which is larger in the affectionate remembrance of his compatriots than in French literary history, for his success was due to the peculiar optimism and buoyancy of his temperament rather than to any special artistic quality. This temperament allowed him to regard his own difficult and harassed life as a subject for comedy and high-spirited rejoicing. His famous work frequently reproduces scenes and incidents in his own experience. The son of a Paris janitor and tailor, he was driven from home as a lad and in his effort to win recognition as a poet was reduced to a condition of starvation which resulted in impairing his vitality and frequently brought him into the wards of Paris hospitals. To support himself he was at intervals, like his hero Rodolphe, reduced to uncongenial and often unpaid tasks on cheap ephemeral trade journals like the *Scarf of Iris* or *Beaver* (*Le Castor*) of the *Scenes.* On one ever memorable occasion he, however, received for past and future services 500 francs, which provides one of the well-known incidents of his story. The indulgent ever-smiling young *Bohémiennes,* like Mimi and Phemie and the rich young lady cousins, never if ever appeared in the doorway of his garret where he toiled unremittingly for success. It is for this reason that it is no true picture either of his own struggle or of the hard-working and serious life of the Latin Quarter of his time, which, though it had its rare gala days of festival and high spirits, had also its long months and years of unrequited toil that often ended in final poverty and failure. For this reason those who know «Bohemia» best refuse to recognize Murger as its portrayer. A truer picture is to be found in the biographies of Balzac or Zola or Daudet, who passed through its toil and trials before or after this time. It should also be remembered in this connection that of the hundreds of talented young men who struggled with them only a very small percentage won lasting recognition or any financial reward. Murger was, therefore, not in any sense a realist but a delightful humorist and idealist who created certain exaggerated but ever fresh and amusing types and who made a life of toil against heavy odds, relieved by the joys of youthful comradeship and kindred aims, appear as one long and uninterrupted holiday. This exaggeration of type is the reason why his heroes and heroines with but little change make the strikingly successful characters of the light opera by Puccini based upon his work. It was Bohemia as he would have wished it, but as it never was for him or his serious brothers in the fellowship of art. See BOHÊME, LA.

CHRISTIAN GAUSS.

SCEPTICISM, in its widest meaning, is a state of doubt or suspense of judgment. It is often used in connection with religious belief, and here indicates doubt or disbelief of authorized doctrines. The word scepticism has a specific meaning, however, which is implied in its more general uses, and in this meaning it has a philosophical reference and relates to the problem of knowledge. Thus used, scepticism signifies systematic doubt or entire disbelief in

the ability of the human mind to attain knowledge of positive or objective truth. Such scepticism has been of frequent occurrence in the history of thought from antiquity to the present time. It has received systematic expression from several noted thinkers who supported their conclusions by explicit arguments. The grounds of systematic scepticism are many and cannot be given in full detail. Its fundamental basis in theory is usually found in the assumption that knowledge arises from a succession of particular sensations which are (1) subjective modifications, and (2) detached and transitory mental states. As subjective modifications, these sensations are the product of the sense-organs of the individual. Their nature depends upon the structure of the particular sense-organ, which varies with each individual, and also upon the bodily condition of the individual which varies from moment to moment. Hence these sensations, being relative to individual structures and conditions, have only a subjective value, and can yield no truth that is objective and necessary for all. As detached and transitory mental states, these sensations can furnish no criterion of truth beyond the single sensation. Because detached and particular, such a single sensation can justify no conclusion of universal validity. Because itself transitory, such a single sensation can reveal nothing of a permanent and abiding reality. Beside these theoretical considerations, many practical reasons have been urged to support scepticism, such as the difference of opinion and belief among different peoples upon most vital matters of life and morals. In antiquity the first important exponents of scepticism were the Sophists of Greece. Of this school Protagoras held that all truth was relative, since all sensations were subjective. At a later period in Greek thought, a systematic scepticism was developed by Pyrrho of Elis and elaborated by his school. According to the Pyrrhonic scepticism, the real nature of things is entirely unknown to us because of the subjectivity of our impressions and opinions: and, consequently, our proper attitude is one of suspense in judgment and apathy in conduct. The foremost representative of scepticism in modern times is David Hume. He maintained that «all knowledge resolves itself into probability»; for, being based upon particular impressions, it can reveal nothing of permanent or objective reality beyond the succession of sensations. In estimating the importance of scepticism in the history of thought, one must distinguish between scepticism as (1) a provisional stage and (2) a final conclusion of thought. As a provisional stage, scepticism has discharge an important office in the development of thought. In the life of both individual and race, periods of scepticism are useful in disposing of traditional beliefs which lack adequate foundation, and so in preparing the way for better-established conclusions. Thus with Descartes a stage of doubt was preliminary to his positive thought, and likewise the scepticism of Hume was preliminary to the constructive philosophy of Kant and his successors. As a final conclusion scepticism has never been permanently satisfactory, because the inherent demand of the human mind is for positive truth.

Consult Plato, 'Protagoras'; Zeller 'Stoics, Epicureans, and Sceptics' (tr. London 1892); Hume, 'Treatise of Human Nature'; Owen, 'Evenings with Sceptics.'

SCEPTRE, originally a staff, the emblem of sovereign power. The baton, or short sceptre, has always remained a sign of distinction. In the Greek assemblies a person who wished to speak received a sceptre from the herald; and the judges also bore it while in the exercise of their authority. Kings swore by the sceptre. By degrees it became the emblem of power alone. Through the Roman emperors it passed to the western monarchs.

SCHAAFFHAUSEN'SCHER, A., (shâf-hou'zĕn-shĕr bănk-fĕr-īnĕ,) **BANKVEREIN.** The A. Schaaffhausen'scher Bankverein of Cologne was founded in 1848 as a reorganization of the firm of Abraham Schaafhausen (seriously affected by the troubles of the same year), with a capital of 5,187,000 thalers (about 15,600,000 marks), of which the initial issue was 3,199,800 thalers. In 1914 it was absorbed by the Disconto-Gesellschaft (q.v.), retaining its name and clientele under the management of W. L. Deichmann, Gustav Mevissen and Victor Wendelstadt, men of caution and experience, the institution began its activities in the fostering of important industrial enterprises. Its purpose may be inferred from an excerpt from the annual report for 1852 — "the function of a great banking institution is not so much to start new branches of industry through extensive participation, as to induce the capitalists of the country, by recommendations based on exhaustive investigations, to turn idle capital toward such enterprises, which, when properly launched, in response to existing requirements, and offering the guarantee of expert management, bid fair to yield reasonable profits." Industrial in purpose, current account business was secondary, and deposits were received only on condition of three, six and 12 months' notice being given for their withdrawal, and then only at a low rate of interest. The close identification from the first with the prosperous and flourishing Rhenish-Westphalian industry, and the strict adherence to its original purpose, lent strength to the Bankverein to weather the financial crisis of 1857 without the necessity of canceling any of its outstanding credits — a strong factor in extending its influence during succeeding years. One after another it nurtured industrial enterprises within its banking zone, each becoming an added source of strength for the Bankverein. In 1891 a branch was opened at Berlin — a branch in fact as well as name — the parent institution remaining the only one of the five German "great" banks having its headquarters outside of Berlin. In 1908 the number of branches was 10, with one silent partnership, or "Commandite" and 15 deposit offices. Six subsidiary banking companies have been founded wholly or in part by the Bankverein (largely in co-operation with the Dresdner bank), giving foreign banking and exchange facilities, a small incident in the general scheme of the Bankverein. Four German banks with 13 branches have been absorbed wholly and another jointly with the Dresdner bank. In addition, through ownership of shares, it maintains community of interest relations with three important banks, having 21 branches and numerous agencies, deposit offices and subsidiary connections. Most important, however, is the community of interest, mutual in terms, between the Dresdner Bank and the Bankverein, beginning 1 Jan. 1904. Representation is maintained on the boards (1908) of 94 other industrial and financial institutions. The capital of the Bankverein (1908) was 145,000,000 marks; and 34,157,125 marks surplus. The total capital power of the A. Schaaffhausen'scher Bankverein group was (1908) 278,538,001 marks, of which 231,000,000 marks constituted the capital, and 47,538,001 marks the surplus. Consult Riesser, Dr. J. (1909), 'Die deutsche Grossbanken und ihre Konzentration'; 'Germany's Economic Forces' (1913); 'Report on Co-operation in American Export Trade' (Washington 1916).

SCHADOW, shä'dō, **Johann Gottfried,** German sculptor: b. Berlin, 20 May 1764; d. there, 27 Jan. 1850. After many vain struggles to become an artist, he was admitted to the studio of the sculptor Tassaert and thus at length succeeded in devoting himself to his chosen art. Soon afterward he ran off with his sweetheart to Vienna, and there married her; and then, at the expense of his father-in-law, went to Italy, where he wrought with unwearied diligence from 1785 to 1787 in the museum of the Vatican and of the Capitol, winning a prize by his group 'Perseus and Andromeda.' In 1788 he obtained the position in Berlin which had become vacant by the death of his teacher Tassaert. His first great work was the monument erected in the Church of Saint Dorothea, Berlin, to the memory of the margrave, natural son of Friedrich Wilhelm II. This was followed by the colossal statue of Ziethen in hussar uniform; the statue of Frederick the Great in Stettin; of Leopold of Dessau in Berlin; of Blücher in Rostock; the Tauenzien monument in Breslau; Luther's in Wittenberg, etc. The four-horse chariot of Victory, over the new Brandenburg Gate of Berlin, was modeled by Schadow. Schadow executed many busts of his eminent countrymen and numerous relievos and statuettes. In 1788 he was made rector and in 1822 director of the Academy of Art in Berlin, a position which he retained until his death. He was one of the first of the modern sculptors who dared to withstand the fantastic mannerism of the 18th century for which he substituted a powerful representation of character based on a study of the antique. His most eminent pupil in this respect is Rauch; among his other pupils may be named Dannecker, Tieck and Zauner. His chief literary works are 'Wittenberg Denkmäler der Bildnerei, Baukunst und Malerei, mit historischen und artistischen Erläuterungen' (1825); 'Polyklet, oder von den Massen des Menschen nach dem Geschlechte und Alter' (1834); 'National-physiognomien, oder Beobachtungen über den Unterschied der Gesichtszüge und die äussere Gestaltung des menschlichen Kopfs, in Umrissen bildlich dargestellt' (1835); 'Kunstwerke und Kunstansichten' (1849). Consult Dobbert, 'Gottfried Schadow' (1887).

SCHADOW, Rudolph, son of the preceding, German sculptor: b. Rome, 9 July 1786; d. there, 31 Jan. 1822. He was trained as sculptor by his father and his principal works are 'Spinning Girl'; 'Achiles and Penthesilea'; 'John Baptist' and 'Virgin and Child.'

SCHADOW-GODENHAUS, gō'dĕn-hows, **Friedrich Wilhelm,** younger brother of the preceding, German painter: b. Berlin, 6 Sept. 1789; d. Düsseldorf, 19 March 1862. He received his first lessons in drawing from his father, then turned to painting and became the pupil of Weitsch. He served in the war between 1806 and 1807 and three years later resumed his artistic studies in Rome, where Cornelius, Overbeck, Veit and others had founded the new school of the Nazarenes (q.v.). He joined their company and from that time made the Italian masters his models, while the favorite subjects of his pencil were biblical, or selected from the mystical and allegorical wonders of mediæval tradition. As in the case of Overbeck, his devotion to this latter field of human imagination led him to become a member of the Roman Catholic Church. He painted 'Heaven's Queen' for Madame von Humboldt and a 'Holy Family' for the Crown Prince Ludwig of Bavaria. The best work he did at Rome is seen in the frescoes for the Casa Bartholdy; 'Jacob with Joseph's Bloody Coat'; 'Joseph in Prison' (both in the Berlin National Gallery). In 1819 he was called to Berlin as professor of the Art Academy there. During his incumbency he painted the 'Bacchanalian Procession' on the proscenium of New Theatre; many portraits; the 'Visit of the Wise Men' in the Garrison Church at Potsdam and another altar-piece for the church at Schulpforta. One of his finest pictures is 'Freeborn Poetry,' a lovely winged maiden rising from earth to heaven. In 1826 he was made director of the Academy in Düsseldorf and with a circle of enthusiastic pupils became the founder of the Düsseldorf school. He retained this connection until 1859, when age and failing sight led him to retire. Among his religious paintings are 'Christ on the Mount of Olives'; 'Christ at Emmaus'; 'The Dead Body of Christ watched over by his Mother surrounded by Angels' (1836). His health drove him to seek a change in the warmer climate of Italy (1840), and at Rome he painted 'Earthly and Heavenly Love'; 'Piety and Vanity in their Relationship with Religion,' the last appearing under the form of the Saviour, and 'Heaven, Purgatory, Hell' after Dante. As an author he wrote 'The Influence of Christianity on the Painter's Art' (1843). His paintings are mostly found in Düsseldorf and Berlin, but one of his best works, the 'Wise and Foolish Virgins,' is in the Museum at Frankfort-on-the-Main. He was perhaps more successful as a teacher and demonstrator than as a creative artist, but he had a very distinct, even though one-sided influence, upon the religious art of Germany. He gave a new and vigorous impulse to the oil painting of his day without resorting to that pre-Raphaelite realism which sometimes lent to the canvases of Cornelius a certain crudeness bordering on the grotesque. Consult Hübner, 'Schadow-Godenhaus und seine Schule' (1869).

SCHAEBERLE, shā'bĕrlé, **John Martin,** American astronomer: b. Würtemberg, Germany, 10 Jan. 1853. He was brought to Ann Arbor, Mich., in his infancy, and was graduated from the University of Michigan in 1876 as a

civil engineer. He has, however, devoted himself to the study of astronomy, to which department of knowledge he has made valuable contributions. From 1876 to 1888 he taught astronomy in the University of Michigan, and was then called to the Lick Observatory at Mount Hamilton, Cal., where he made several important astronomical investigations. He had charge of the expedition to witness the eclipse at Cayenne in 1889, and of those for the same purpose to Chile in 1893, and to Japan in 1896. He is now, and has been for some years past, engaged in theoretical and experimental investigations on gravitation, light, heat and electricity. He is a frequent contributor to astronomical journals.

SCHAEFFER, Nathan C., American clergyman and educator: b. Maxatawny, Berks County, Pa., 3 Feb. 1849; d. Lancaster, Pa., 14 March 1919. In 1867 he was graduated at Franklin and Marshall College after which he studied divinity at the Theological Seminary of the Reformed Church and finished his education at the universities of Berlin, Tübingen and Leipzig. From 1875 to 1877 Dr. Schaeffer was professor at Franklin and Marshall College and from 1877 to 1893 was principal of the Keystone State Normal School. In the year last named he became State superintendent of public instruction, a post he held until his death. He also served as president of the State board of education and was president of a commission that prepared a new school code for the State, and was a member of the simplified spelling board. In 1879 he received the degree of doctor of philosophy and in 1904 received the degrees of doctor of divinity and doctor of laws from Dickinson College. He was a prolific writer on educational and religious subjects. His works include 'Thinking and Learning to Think' (1900); 'History of Education in Pennsylvania'; (editor) 'Bible Readings for Schools' (1897); introduction to Hinsdale's 'Civil Government'; Riddle's 'Nicholas Comenius'; 'Life of Henry Harbaugh,' and editor of the *Pennsylvania School Journal* after 1893.

SCHAFF, David Schley, American Presbyterian clergyman and educator, son of Philip Schaff (q.v.): b. Mercersburg, Pa., 17 Oct. 1852. He was graduated at Yale in 1873 and in 1877 was ordained in the Presbyterian ministry. He served as pastor in 1877–1907; was professor of church history at Lane Theological Seminary in 1897–1903; and since 1903 has been professor of ecclesiastical and doctrinal history there. He was a delegate to the Pan-Presbyterian Council at Aberdeen, Scotland, in 1913. He was one of the editors of the 'Schaff-Herzog Encyclopedia' (4 vols., 1883); and of 'History of the Christian Church' (Vols. I–II, 1907–10); and author of 'Commentary on Acts' (1882); 'Life of Philip Schaff' (1897); 'John Huss' (1915), etc. He translated 'The Church' by Huss (1915).

SCHAFF, Philip, American clergyman and scholar: b. Coire, Switzerland, 1 Jan. 1819; d. New York, 20 Oct. 1893. He studied at Tübingen, Halle and Berlin, and was a lecturer in the latter university in 1842–44. He then came to this country where he was professor in the theological seminary of the German Reformed Church at Mercersburg (Pa.) 1844–63. In 1864–69 he was lecturer in several theological institutions, and in 1870 became professor of sacred literature in Union Theological Seminary, New York. This post he held until his transference in 1887 to the chair of church history in the same institution. He was one of the founders of the Evangelical Alliance and went as delegate to its general conferences at Basel in 1879, and at Copenhagen in 1884. He was president of the American Bible-revision committee, organized by him in 1871 at the request of the British committee. He was a prolific writer and editor, his works including 'History of the Apostolic Church' (1853); 'History of the Christian Church' (1867; new and enlarged edition, 7 vols., 1889–92); 'Creeds of Christendom' (1877); 'Schaff-Herzog Encyclopedia of Religious Knowledge' (as editor); 'Dictionary of the Bible' (1880); 'Church and State in the United States' (1888); 'Literature and Poetry' (1890).

SCHAFFHAUSEN, shäf'how-zĕn, Switzerland: (1) Capital of the canton of its own name, situated on an eminence overlooking the Rhine, 24 miles north of Zürich. It is quaintly and irregularly built. The buildings most worthy of notice are the feudal castle of Munot, of Roman construction, standing on a commanding height; the parish or Saint John's Church; and the cathedral (1052), a massive basilica containing a bell whose inscription suggested Schiller's 'Song of the Bell,' and Longfellow's 'Golden Legend'; the town-house (1412); the Imthurneum, containing theatre, concert rooms, etc., the museum containing manuscript collections of Johann von Müller, who was born here, the town library, etc. There are primary and high schools. The environs are beautiful; three miles distant are the celebrated falls of the Rhine, almost 300 feet broad, falling more than 70 feet in three cascades formed by two pillars of rock. The Fäsenstaub is a fashionable promenade. The principal industrial works are the wagon and carriage factories, cotton and woolen manufactories, iron works, distilleries and breweries. Pop. about 15,957. (2) The canton of Schaffhausen covers an area of 114 square miles, and occupies the most northern angle of the Swiss territory. It belongs to the Swabian Jura, and the population uses almost exclusively the German tongue. The canton entered the Swiss Confederation in 1501, and by the constitution of 1876 became exceedingly democratic. Education is compulsory. The taxes are very low. Financially it is the most favored among the Swiss cantons. All the cereals are raised, besides hemp and flax. There is abundance of fruit, especially grapes. The principal manufactures are aluminum, wagons, wool, ropes and watches. Pop. about 47,270.

SCHÄFFLE, shā'flĕ, **Albert Eberhard Friedrich,** German political economist and sociologist: b. Nurtingen, Würtemberg, 24 Feb. 1831; d. Stuttgart, 24 Dec. 1903. He was educated for the ministry at Tübingen but adopted a journalistic career. In 1861 he was called to the University of Tübingen as professor of political economy, and in 1868 to Vienna. His principal contributions to the literature of political science are his 'National Economy' (1861-73); 'Capital and Socialism' (1870); 'The Fundamental Principles of Taxation' (1880); and 'Quintessence of Socialism' (1884, 8th ed., 1885). In 1895 he began to write upon sociological questions and to develop the biological theory of society. His 'Bau und Leben des socialen Körpers' is a more detailed attempt to explain society as a living organism than that essayed by any previous writer. This book, completed in 1896, placed him in the ranks of modern sociologists.

SCHAFFNER, Jakob, German novelist: b. Basle, Switzerland, 15 Nov. 1875. He carried on his university studies in his native city, and there he wrote most of his works until he changed the scene of his studies to Charlottenburg, near Berlin, in 1912. His best novels are 'Irrfahrten' (Berlin 1905; title later changed to 'Irrfahrten des Jonathan Bregger' 1912), and 'Die Erlhöferin' (Berlin 1908, 15,000 sold in two years). His early poverty is reflected in most of his works, 'Irrfahrten' ("Wanderings"), for instance, has convincing pictures from the life of working people in their daily toil, while 'Konrad Pilater' is a story of a rather whimsical journeyman shoemaker (embodying scenes of Schaffner's boyhood as a shoemaker). Later novels are 'Konrad Pilater' (Berlin 1910); 'Der Bote Gottes' (1911), and 'Die goldene Fratze' (Berlin 1912). A translation of 'The Iron Idol' appears in 'German Classics' (Vol. XIX, New York 1914).

SCHALCKEN, shäl'kĕn, **Godfried,** Dutch artist: b. Dordrecht, 1643; d. The Hague, 16 Nov. 1706. He was the pupil of Samuel van Hoogstraten and Gerard Douw. He visited England where he painted portraits, especially one of William III. His best work is in genre, and here he approached though still remaining inferior to his master Douw. He was fond of representing scenes by candle light, though he was scarcely ever quite true in the color representation of such light. When he attempted portraits in full length, as the fashion of the time of Sir Godfrey Kneller demanded, his efforts were not successful, with the possible exception of the portrait of William III, now in the Amsterdam Museum, but he soon became sensible of his error, and again painted on a small scale. Some of his best works are at the museums of Vienna, Dresden, Munich, Berlin, Amsterdam, The Hague, and at the Louvre.

SCHAMYL, shä'mil (Samuel), Tartar imam and warrior, leader among the tribes of the Caucasus: b. Aul Himri, northern Daghestan, 1797; d. Medina, March 1871. From 1824 to 1831 he took energetic part in Kasi Mollah's "holy war" against the infidel Russians, being severely wounded at the storming of Himri. A Sufi, he labored for the recrudescence of his faith in Daghestan, and was markedly successful. From 1837 he was temporal and spiritual head of the mountain tribes. His guerrilla method of warfare long enabled the Circassians to continue the struggle against Russia. During the Crimean War he was supplied by the allies with arms and money. After incredible escapes he was at last taken (6 Sept. 1859), and kept under surveillance, though treated with consideration.

SCHARF, shärf, Sir **George,** English artist: b. London, 16 Dec. 1820; d. Westminster, 19 April 1895. He studied art under his father, a Bavarian artist who had settled in England, and in 1838, after gaining medals from the Society of Arts, entered the Royal Academy schools. In 1840 he visited Asia Minor, and again in 1843 as draughtsman to a government expedition. On his return he devoted himself to painting in oil and to book-illustration, among the books illustrated by him being Murray's 'Prayer Book,' Macaulay's 'Lays,' Milman's 'Horace,' Kugler's 'Handbook of Italian Painting,' Layard's books on Nineveh, Keats' Poems, and Sir W. Smith's Classical Dictionaries. He rendered valuable assistance to the Crystal Palace authorities in planning the Greek, Roman and Pompeian courts, and to Charles Kean in his Shakespeare revivals of 1851–57. He was art secretary to the Manchester exhibition of 1857, and on the foundation of the National Portrait Gallery he began to make a special study of portraits, on which he soon became a recognized authority, and in 1882 he received the title of director of the gallery. His publications comprise 'Recollections of Scenic Effects' (1839), the part on sculpture in Waring's 'Art Treasures of the United Kingdom' (1857). To his great knowledge and industry the National Portrait Gallery owes almost its whole value.

SCHARF, John Thomas, American historian: b. Baltimore, Md., 1 May 1843; d. there, 28 Feb. 1898. At the outbreak of the Civil War he entered the Confederate army, was engaged in the battles around Richmond, at Cedar Mountain, the second Battle of Bull Run and at Chancellorsville, and in 1863 became a midshipman in the Confederate navy. He participated in the capture of the *Underwriter*, near New Berne, N. C., and after the blockade was established he again joined the army. While on his way to Canada with dispatches he was captured. In 1874 he was admitted to the bar, was a member of the legislature in 1878 and in 1884 he was appointed commissioner of the land office of Maryland. He was editor of the Baltimore *Telegram* and of the *Morning Herald* and wrote 'Chronicles of Baltimore' (1874); 'History of Maryland' (3 vols., 1879); 'History of the Confederate States Navy' (1887); 'Natural and Industrial Resources and Advantages of Maryland' (1885–90), etc.

SCHARNHORST, shärn'hŏrst, **Gerhard Johann David von,** Prussian general: b. Bordenau, Germany, 12 Nov. 1755; d. Prague, 28 June 1813. He entered the Hanoverian army in 1780 and soon distinguished himself as an officer of artillery. In 1804 he was knighted by the king of Prussia, and in 1813 attained the rank of general in the Prussian army. In the reorganization of the army of Prussia in 1809–13 he proved himself an able general. The national spirit, awakened by the loss of the territories west of the Elbe, was greatly augmented by the genius of Scharnhorst, who infused the military spirit throughout the scattered populations of the Prussian domain by raising a large and well-disciplined volunteer army for the War of Liberation. In this campaign he was chief of staff under Blücher, but was mortally wounded at the battle of Lützen. Consult 'Life by Lehmann (1886–87); von Boyen, 'Erinnerungen' (1891).

SCHECHEM, shĕk'ĕm, Palestine. See NABULUS.

SCHECHTER, shĕн'ter, **Solomon,** American theologian and Orientalist: b. Foçsani, Rumania, 1847; d. 19 Nov. 1915. Participating in the rabbinical training given to Jewish children of his environment, in maturer years he attended the Berlin and the Vienna universities and was graduated as rabbi in Venice. He was reader of Semitics, Cambridge University, England, 1892–1902, and professor of Hebrew at University College, London, 1898–1902. He traveled in Italy, Egypt and Palestine and made interesting discoveries of manuscripts in Cairo of peculiar value to students of the Old Testament. He wrote 'Aboth de Rabbi Nathan' (1887); 'Studies in Judaism' (1896); 'The Wisdom of Ben Sira' (1899); 'Midrash-Hagadol' (1902); 'Saadyana' (1902); 'Studies in Judaism' (2d series, 1908); 'Some Aspects of Rabbinic Theology' (1909); 'Documents of Jewish Sectaries' (2 vols., 1911); and after 1902 was president of the Jewish Theological Seminary of New York. In 1911 Harvard conferred on him the degree of Litt.D.

SCHEDONE, shā-dō'nā, or **SCHIDONE, Bartolommeo,** Italian painter: b. Modena, about 1570; d. there, 1615. He acquired an admirable style by a careful and long continued study of Correggio, and his natural genius under the inspiration of that master enabled him to produce a great number of graceful and delicate pictures, both in fresco and oils. His portraits are the most remarkable of his productions and he painted many of the principal citizens of his native town. He also produced a great many religious paintings and was a successful etcher.

SCHEELE, shā'lĕ, **Karl Wilhelm,** Swedish chemist: b. Stralsund, 19 Dec. 1742; d. Köping, 21 May 1786. His early education was received at Gothenburg. In 1770 he was made assistant professor of chemistry at Upsala, and there became celebrated as one of the greatest scientists of his time. His independent discovery of oxygen, a few months after that of Priestley, places him in the front ranks of the early physicists. He is known also as the discoverer of tartaric acid (1770), chlorine (1774), baryta (1774), glycerine (1784), and prussic acid (1782), and, ignorant of the results of Priestley's experiments, he also claimed the discovery of oxygen (1777). A new coloring matter commonly known as Scheele's green was obtained by his experiments with arsenic. He was the author of 'Chemical Observations and Experiments on Air and Fire' (1777); 'Essay on the Coloring Matter in Prussian Blue' (1782).

SCHEELITE, native calcium tungstate. A mineral often found in crystalline quartz, associated with cassiterite, topaz, fluorite and wolframite. It is distinguished by its high specific gravity, 5.88 to 6.14, moderate hardness, 4.5 to 5, vitreous to adamantine lustre, the pyramidal hemihedrism of its tetragonal crystals, and their eminent pyramidal cleavage. Its streak is white, but its superficial colors vary greatly, white, yellowish or brownish being the most common. It is widely distributed, though not an abundant mineral, its occurrences in Bohemia, Saxony, Piedmont and England are the best known, while in Tasmania and at Trumbull, Conn., it is found in commercial quantities and has been mined as an ore of tungsten. Molybdenum is usually present replacing part of the tungsten.

SCHEFER, shāf'ĕr, **Leopold,** German author: b. Muskau, Lower Lusatia, 30 July 1784; d. there, 16 Feb. 1862. After a gymnasial training he devoted himself to literature, the only post he held being that of superintendent of the estates of Count Pückler, with whom he made in 1816–20 a journey to Italy and the East. His study of Oriental philosophy and religion appears in much of his verse. His works of fiction, structureless and vague in characterization, are greatly inferior to his poetry, which is collected in such volumes as 'Vigilien' (1842); 'Gedichte' (3d ed., 1846); 'Das Laienbrevier' (1834; 18th ed., 1884), and 'Der Weltpriester' (1846). The last two were turned into English by C. T. Brooks (q.v.), as 'The Layman's Breviary' (1868) and 'The World Priest' (1873). Schefer was also something of a composer, writing an opera ('Sakontala') and several quartettes. His 'Ausgewählte Werke' appeared in 1845–46 (2d ed., 1857). Consult the biography by Brenning (1884).

SCHEFFEL, shĕf'fĕl, **Joseph Victor von,** German poet: b. Carlsruhe, 16 Feb. 1826; d. Carlsruhe, 9 April 1886. He was educated for the law at Heidelberg, Munich and Berlin, but gave up his legal career almost as soon as it was begun for that of literature. His first and greatest book, 'Der Trompeter von Säckingen,' appeared in 1854. This poetic romance of the Thirty Years' War reached its 190th edition in 1891. His second book, a romance in prose entitled 'Ekkehard' (1855), was also one of the most popular of German love stories. His other works are 'Hugideo' (1884) and 'Gaudeamus' (1867–91), both romances; 'Frau Aventiure' (1863–83); 'Bergpsalmen' (1870–83); 'Waldeinsamkeit' (1880). (See TRUMPETER OF SAKKINGEN, THE). Consult Klar, 'Scheffel und Seine Stellung in der Deutschen Literatur' (1876); Lives of Pröess (1887); Ruhemann (1866); Pilz (1887), and Zernin, 'Erinnerungen' (1886).

SCHEFFER, shĕf'fĕr, **Ary,** Dutch painter: b. Dort, Holland, 1795; d. Argenteuil, near Paris, 15 June 1858. At an early age he sought Paris to study for the profession of an artist. Here he became a pupil of P. Guérin. His first picture, 'Abel Singing a Hymn of Praise,' was exhibited in 1812, and at once established his reputation. In 1817 he produced the 'Death of Saint Louis'; in 1819 the 'Surrender of Calais to Edward III'; and in 1822 'Francesca da Rimini.' Of extremely versatile talents, Scheffer traversed a very wide field in the domain of art, and his pictures comprise subjects both sacred and secular, historical and imaginative. Of the first of these the most celebrated are 'Christ Blessing Little Children' · 'The Agony in the Garden,' and 'Christ the Comforter.' From the writings of Goethe he has produced some admirable works, such as 'Margaret,' 'Mignon,' the 'King of Thule' and others; from Dante, 'Beatrice,' from Byron, 'Medora,' and from Schiller, 'Eberhardt.' Scheffer's pictures are principally remarkable for the refinement of expression and depth of feeling which they display. They are highly prized by collectors and a small replica of 'Paolo and Francesca da Rimini' was sold in 1870 for

$9,607. Many of his chief works are in the Luxembourg or at Versailles.

SCHEIDEMANN, shī'dĕ-män, **Philip,** German Socialist leader: b. Cassel, 26 July 1865. His father was a skilled artisan and the boy attended both the Bürgerschule and the Realschule of his native city, later learning the trade of printer (1879–83). He became a member of the Social-Democratic party at the age of 18, and has been engaged in its activities ever since. In 1895 he became editor of a Socialist paper at Giessen, in 1900 at Nürnberg, later also at Offenbach and Cassel. In 1913 he toured the United States, lecturing in many cities before German-speaking branches of the Socialist party. In August 1914 he became rightly notorious through having defended the action of the Imperial German government declaring war on France and Russia, and, contrary to all the teachings of Socialism, aided in securing to the government the support of the Social-Democratic party, which published aggressive justifications of the imperialistic war and induced a chauvinistic spirit throughout the country. After the German Revolution of 7 Nov. 1918 Scheidemann was a powerful factor in the counsels of the right wing of the party, supporting the new Socialist Chancellor, Friedrich Ebert, who took office 9 November. Most of the great Socialist leaders of the country were opposed to his tactics in retaining the former Imperial Minister, Dr. Solf, in the new Cabinet, and frequent uprisings of the Berlin ultra Radicals showed this disapproval of the Scheidemann-Ebert régime, 6 Dec. 1918. Scheidemann was for a moderate revolution in Germany; he expressed his disapproval of the Russian Bolshevik Revolution in the strongest terms.

SCHEINER, shī'nĕr, **Christolph,** German astronomer: b. at Waldt in Swabia, about 1575; d. 1650. Scheiner was professor of Hebrew and mathematics at Freiburg and at Ingolstadt from 1610–16, and after several years' residence in Rome he became rector of the Jesuit College at Neisse in Silesia. In 1612 he published his 'Tres Epistolæ ad Marcum Velserum' and claimed to have seen sun spots as early as March 1611. He thus antagonized Galileo whom he further provoked by upholding the old thesis of a "stable" earth and a "mobile" sun. 'Rosa Ursina' (1630) was his great work on the sun and contained the results of about 2,000 observations.

SCHELDT, skĕlt, or **SCHELDE,** shĕl'dĕ (ancient SCALDIS), a river belonging in the various parts of its course to France, Belgium and the Netherlands. It rises in the French department of Aisne, at a height of 295 feet above sea-level, in the small lake of Beaurevoir, near Catelet. It flows northerly to Cambria, Valenciennes, Boudain and Condé, where it first becomes navigable after junction with the Saint Quentin Canal. It enters Belgium between Montagne and Hollain, passes Doornik, Oudenarde, Ghent, Dendermonde, Rupelmonde, Tournai and Antwerp; at Ghent is joined by the Lys and the canals which connect that city with Sas and Bruges. There is considerable tide at Ghent, somewhat modified by sluices. The river makes a great bend toward Dendermonde and Antwerp, flows circuitously north forming the boundary between Antwerp and East Flanders provinces. At Antwerp it measures 1,600 feet in width, 45 feet in depth and still wider below, forms a secure harbor, which is capable of receiving the largest ships. Again turning northward, it is finally lost in the estuaries among the islands of Zealand. After reaching the Dutch frontier it divides into the East and West Scheldt, the latter and main stream flowing into the North Sea, below Flushing. Both branches connect with the Meuse and the Rhine. The entire length of the river is 211 miles. Its principal affluents are the Haine Dender, the Rupel, the Sensée, Scarpe and Lys. The entire region traversed by the Scheldt was made memorable by the appalling operations of the Teutonic armies in the World War from the time (1914) when Germany violated the guaranteed neutrality and political integrity of Belgium by sending her armies through it to gain entrance into France.

SCHELLING, shĕl'lĭng, **Felix Emanuel,** American educator: b. New Albany, Ind., 3 Sept. 1858. In 1881 he was graduated at the University of Pennsylvania, where he received the degree of LL.B. in 1883 and that of A.M. in 1884, and of Litt.D. in 1903 and LL.D. in 1909. Since 1893 he has been John Welsh Centennial professor of English literature at the University of Pennsylvania. Dr. Schelling is a member of the National Institute of Arts and Letters, of the American Philosophical Society and of the Modern Language Association of America. He has published 'Literary and Verse Criticism of the Reign of Elizabeth' (1891); 'Life and Works of George Gascoigne' (1893); 'A Book of Elizabethan Lyrics' (1896); 'A Book of 17th Century Lyrics' (1899); 'The English Chronicle Play' (1902); 'The Queen's Progress and Other Elizabethan Sketches' (1904); 'History of Elizabethan Drama' (1908); 'English Literature during the Lifetime of Shakespeare' (1910); 'The Restoration Drama' (Cambridge History of Literature, 1912); 'The English Lyric' (1913); 'A History of English Drama' (1914). He has edited 'Ben Jonson's Discoveries' (1892); 'Eastward Ho and the Alchemist' (1903); 'The Merchant of Venice' (1903); 'Macbeth' (1910); 'Beaumont and Fletcher' (1912).

SCHELLING, Friedrich Wilhelm Joseph von, German philosopher: b. Leonberg, in Württemberg, 27 Jan. 1775; d. Ragaz, Switzerland, 20 Aug. 1854. He studied theology and philosophy at Tübingen and natural science at Leipzig. His philosophy of nature as presented in 'Ideen zu einer Philosophie der Natur' (1797) and in 'Von der Weltseele' (1798), gained for him an appointment as professor at the University of Jena (1798). There he became the leading philosopher of the "early romanticists" and was highly esteemed by Goethe. In 1803 he married Caroline, the former wife of A. W. Schlegel (q.v.), and accepted a professorship in Würzburg. From 1806 to 1820 he lived in Munich as a member of the Academy of Science and also (since 1809) as general secretary of the Academy of Arts. He resumed his academic work from 1820 to 1827 at Erlangen, and from 1827 to 1841 at Munich. The theosophical turn of his later works induced Frederick William IV of Prussia to call him to the University of Berlin (in 1841), as a counterweight against the radi-

cal left wing of Hegel's disciples. But his lectures on mythology and revelation met with scant success and he retired in 1846. Among the ever-changing phases of his philosophical evolution two main periods may be distinguished; the first, which found its consummation in his "system of identity," is pantheistic in its general character; in the second period, beginning about 1806, he elaborates his "positive" philosophy, which rests on a theistic and theosophical basis.

Schelling had originally started as a disciple of Fichte's "Philosophy of the Ego," but his study of Spinoza and his own love of nature soon induced him to attempt a vindication of the external world, which Fichte had degraded by defining it as the mere "Not-self." In Schelling's Philosophy of Nature the external world is the preliminary stage (Vorstufe) of the Spirit. Nature is the unconscious side of the "Absolute" or "Infinite," just as the Spirit is its conscious side. Like Fichte, he conceives the "Absolute" as a process, as an activity (not as a substance) which continuously ascends from lower to higher forms of development. In carrying out this scheme he made use of many of the new ideas and discoveries that were then revolutionizing the natural sciences. Polarity (as exhibited in the two poles of a magnet) appears to him as the principle of all phenomena of nature. Everywhere, he sees dualism and polarity: positive and negative factors which neutralize each other, leading up to and producing a new reality. By means of repeated steps from lower to higher potencies the "Soul of Nature" (Weltseele) unfolds itself. The primal dualism of expansion ("imponderable matter," ether) and contraction ("ponderable matter," gravity) reveals itself more distinctly in the magnetic, electrical and chemical phenomena of the inorganic world, and in the corresponding functions of reproduction, irritability and sensibility of living organisms.

In the phenomena of sensibility the external order of things reaches its culminating point. But the same processes of polarity and evolution appear again on a different plane in the inner world of conscious existence. In his 'System of Transcendental Idealism' (1800; extracts translated in Prof. Benj. Rand's 'Modern Classical Philosophers,' 1908) Schelling represented the "Epochs of Self-consciousness" as parallel to the successive stages in the development of nature. Finally, the objective and subjective side of ourself (or the theoretical and the practical attitude of the mind, or intellect and activity) are carried to their harmonious union in the world of art and poetry. In art the human mind achieves the actual synthesis of the conscious and the unconscious. Art is the organ of the true philosopher; his highest aim must be a new mythology, which is to unite philosophy and poetry in objective representation.

The first period of his philosophy found its final expression in his "system of identity," as set forth in the 'Darstellung meines Systems' (1801), in the platonic dialogue 'Bruno' (1802) and in the 'Methode des akademischen Studiums' (1803). Merely comprehended by the analytical and formal faculty of the intellect, the universe divides itself into the two great regions variously denominated as Nature and Self, Matter and Spirit, Real and Ideal. But the connecting faculty of reason or "intellektuale Anschauung" (intellectual sight or perception, which is akin to the "intuition" of artistic genius) shows the antithesis of the two regions as only relative. Both are originally and essentially One; they are only two different forms of manifestation of the One Infinite. The Infinite or Absolute is the eternal Identity of the Real and the Ideal, which are the two poles of the Absolute. The process of the Universe consists in the splitting up of the original "absolute Indifference" into the opposites that were latent in it, and in the striving for a reunion of the "differences" in an ultimate absolute Identity. This active process of the Absolute, ascending from "indifference" through polar differentiation toward "identity," is also conceived by Schelling, in this period, as identical with the evolution of God.

After 1806, Schelling gradually became convinced that this rationalistic pantheism, which he now stigmatized as "negative," must find its counterpart and consummation in a "positive" system. The "thread of dialectical movement may be sufficient as a guide through the world of the purely rational but it breaks as soon as it takes the weighty step into reality," into the world of empirical specification. Here the contingent must be added to the necessary, and rational knowledge must be supplemented by irrational, but definite, experience of a higher order, which acquires the character of "Revelation." The creation of the World is now the free act of a supernatural and personal God; the actual or contingent world has come into existence by a mystical falling away from the original identity in which it lived in the bosom of the Absolute and Divine Being. Schelling's 'Essence of Human Freedom' (1809) shows clearly the influence of Jacob Böhme's theosophy. His 'Philosophy of Mythology and of Revelation,' published after his death, consists of mystical speculations about pagan mythology and Christian doctrines. He distinguishes a Petrine and a Pauline Christianity which are represented in the Catholic and Protestant churches. Both are dominated by the Johannine theology which is the highest form of Christianity.

As an eclectic of the highest order, Schelling assimilated and welded into an imposing synthesis such divergent types of human thinking as Kant, Spinoza, Leibniz, Fichte, Plato, Bruno, Böhme, Plotinus and the Gnostics. His philosophy of nature alone gained an immediate and powerful influence, not only in Germany, where Goethe, the romanticists and most of the scientists considered him as their philosophical spokesman, but in the rest of Europe also through disciples like Coleridge and V. Cousin. His conception of one continuous process of evolution which would embrace in successive steps the lifeless and the living world, was a great philosophical anticipation and did much to promote a scientific study of nature. But his method of reasoning by suggestive analogies and, in general, the artistic turn of his mind brought him into discredit among the younger school of exact scientists. For a time it was customary to deride him as the founder of "speculative physics." But many of his leading ideas have since been vindicated before the scientific world.

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TRAUGOTT BÖHME.

SCHENCK, shĕnk, **Carl Alwyn,** American forester: b. Darmstadt, Germany, 25 March 1868. He studied at Darmstadt and Tübingen, and was graduated from the University of Giessen. He was forest assessor of the grand duchy of Hesse, served in the German army, came to the United States in 1895, and became director of the Biltmore Forest School and forester to George W. Vanderbilt's Biltmore estate. He wrote 'Our Yellow Poplar' (1896); 'Forestry for Kentucky' (1899); 'Forest Utilization' (1904); 'Biltmore Lectures on Sylviculture' (1905); 'Forest Management' (1907); 'Forest Policy' (1911), etc.

SCHENCK, Robert Cumming, American diplomat: b. Franklin, Ohio, 7 Oct. 1809; d. Washington, D. C., 23 March 1890. He was graduated at Miami University in 1827, and remained there as tutor until 1830. In that year he became a student of law in the office of the Hon. Thomas Corwin at Lebanon, Ohio, and was admitted to the bar in 1831. He began the practice of law at Dayton, Ohio, and soon achieved marked success in his profession. In 1840, during President Harrison's "Log Cabin" campaign, he was elected to the legislature of Ohio, and entered upon his political career. He soon became a leader in the Whig party, and was recognized throughout his section as an able and effective public speaker. In 1843, after an exciting political contest, he was elected to his first term in Congress, retaining his seat until 1851, and becoming one of the most prominent leaders of his party at Washington. In 1851 he was appointed United States Minister to Brazil, where he remained some years, and performed important diplomatic service.

When the Civil War began he promptly offered his services to the government, and received a commission of brigadier-general of volunteers. He was severely wounded at the second battle of Bull Run, and his right hand and arm permanently disabled. He was later promoted to the rank of major-general, and served in the army until December 1863, when he resigned his commission to accept a seat in Congress, to which he had been elected in the fall of 1862 over Clement L. Vallandigham (q.v.). General Schenck's military and political abilities were at once recognized and he was appointed chairman of the Military Committee of the House and rendered important and arduous services. He was three times elected to Congress. He served as chairman of the Committee on Ways and Means and became the leader of his party in the House. On 22 Dec. 1870 he was appointed Minister to Great Britain by President Grant, a position which he filled with distinction until 1876. During this term of service he was appointed member of the historic Joint High Commission which assembled at Washington, and provided by treaty for the Geneva Conference, a measure that resulted in substituting arbitration instead of war in the settlement of the serious controversies that had arisen between Great Britain and the United States, regarding the Alabama claims and other important subjects. His tact and force, and his knowledge of international law, were most useful in determining the great questions involved.

SCHENCK, William Edward, American clergyman: b. Princeton, N. J., 29 March 1819; d. Oakenout, Pa., 14 Dec. 1903. He was graduated from Princeton in 1838, from the theological seminary there in 1841 and was ordained in 1843. He was engaged in pastoral work in New Jersey and New York until 1852, was secretary of the Presbyterian Board of Publication in 1854–86 and its editor in 1862–70, and from 1865 was a director of Princeton Theological Seminary. He published 'Historical Account of the First Presbyterian Church of Princeton, N. J.' (1851); 'Church Extension for Cities' (1854); 'Nearing Home' (1863); 'The Fountain for Sin' (1864); 'Children in Heaven' (1867), etc.

SCHENECTADY, N. Y., city, county-seat of Schenectady County, on the Mohawk River, new Barge Canal and on the New York Central and Hudson River and the Delaware and Hudson railroads, 16 miles west of Albany. It has connection with the Boston and Maine Railroad at Scotia and with the West Shore Railroad at South Schenectady. Local lines connect the city with Troy, Mechanicville, Saratoga Springs and other nearby places. That part of the city along the bank of the river is the oldest; most of the modern buildings have been erected on the surrounding heights.

Buildings and Municipal Improvements.— The principal public buildings are the post office, county courthouse, municipal buildings, Van Curler Opera House, a State armory, Home of the Friendless, Children's Home, Ellis Hospital, the Young Men's Christian Association building and the church and school buildings. The location, in the Mohawk Valley, is in a fertile agricultural region. The slope to the river is such as to make the natural surface drainage almost sufficient, but a good sewerage system has been introduced. The water is distributed by means of the Holly system.

Manufacturing.— Figures relative to the number employed here show a total of over 26,000. Unlike many other cities all but 2,000 of these are employed in two large industries.

The census of 1914, like that of 1909, with reference to manufactures, excluded the hand trades, the building trades and the neighborhood industries, and took account only of establishments conducted under the factory system. In the last census, also, as in that for 1909, statistics were not collected for establishments having products for the census year

valued at less than $500, except that reports were taken for establishments idle during a portion of the census year, or which began operation during that year and whose products for such reason were valued at less than $500. Schenectady is also the headquarters for the General Electric Company and for the American Locomotive Company whose plants in this city alone are employing 24,000.

Summary for the City.— A comparative summary for the city for 1909 and 1914 follows:

	Census		Per cent of increase, 1909–1914
	1914	1909	
Number of establishments	184	134	37.3
Persons engaged in manufactures	21,262	17,728	19.9
Proprietors and firm members	176	120	46.7
Salaried employees	3,380	2,677	26.3
Wage earners (average number)	17,706	14,931	18.6
Primary horse power	61,584	49,181	25.2
Capital	$57,383,000	$51,816,000	10.7
Services	17,445,000	13,088,000	33.3
Salaries	4,633,000	3,086,000	50.1
Wages	12,812,000	10,002,000	28.1
Materials	22,520,000	21,952,000	2.6
Value of products	48,761,000	38,165,000	27.8
Value added by manufacture (value of products less cost of materials)	26,241,000	16,213,000	61.8

Churches and Schools.— There are 70 churches, embracing all denominations. The educational institutions are Union University (q.v.), 24 public schools, two parish schools, two business colleges, three private schools, a free public library and the college and high school libraries.

Banking and Finances.— There are two national banks with a combined capital of $200,000, a savings bank with deposits of about $5,500,000 and two trust companies with $500,000 capital and surplus. The annual cost for municipal maintenance and operation is about $850,000.

History.— Schenectady was settled in 1661 by Arent Van Curler, and letters patent were granted in 1684. On 8 Feb. 1690 the place was attacked by a force of French and Indians, who massacred all but 60 of the inhabitants and burned the town. In 1765 it was incorporated as a borough and in 1798 chartered as a town. In 1819 a disastrous fire destroyed nearly all the business portion of the city. Among the early steam railroads in the United States was one from Albany to Schenectady. The water communication by means of the Mohawk, increased by the new Barge Canal and the railroad communication at an early date, all contributed toward making the city a commercial and industrial centre. It has increased steadily in population and industries. Pop. (1880) 13,655; (1890) 19,902; (1900) 31,682; (1910) 72,826; (1920) 88,723.

SCHENK, Leopold, Austrian embryologist: b. Urmeny, Hungary, 23 Aug. 1840; d. Schwanberg, Styria, 17 Aug. 1902. He was graduated at Vienna in 1865 and was appointed assistant professor of embryology there in 1873. He attained world-wide notoriety and the censure of the medical profession generally for his theories concerning sex control of the embryo through the diet of the mother. He also worked the theory into an elaborate plan for control of the development of the race. He was eventually forced to resign his position in the university. Besides several textbooks he was author of 'Einfluss auf das Geschlechtsverhältniss des Menchen und der Thiere' (1898; Eng. trans., 'The Determination of Sex,' 1898).

SCHENSCHIN, shĕn'shĭn, **Afanassij Afanasjewitch,** Russian poet: b. Mzenek district government Orel, 4 Dec. 1820; d. Moscow, 4 Dec. 1892. He studied at Moscow, was in the army in 1853–56, then devoted himself wholly to literature, and under the pseudonym "A. Fet" published several collections of lyrical verse (1840, 1850, 1863, 1883–91). He also made excellent renderings from Shakespeare, Goethe and the Latin classics.

SCHERER, shā-rār, **Edmond (Henri Adolphe),** French critic: b. Paris, 8 April 1815; d. Versailles, 16 March 1889. He studied at the law faculty of Paris, took a course in theology at Strassburg, entered the Protestant ministry in 1840 and in 1845 became professor of exegesis in the Ecole Evangelique, Geneva, popularly known as L'Oratoire. This he resigned in 1849 and became a leader in the liberal movement in Protestant theology. He was elected to the National Assembly from Seine-et-Oise in 1871 and became life-senator in 1875. In both chambers he was a prominent representative of the left centre. He was made chief literary critic of the *Temps* in 1860, later its editor. He took rank as a brilliant though opinionated critic, his reputation in this field having been made by a series of articles on important thinkers and writers of other literatures in the *Revue des Deux Mondes.* Among his writings in book form are 'Dogmatique de l'Eglise Réformé' (1843); 'La Critique et la Foi' (1850); 'Alexandre Vinet, sa vie et ses écrits' (1853); 'Etudes Critiques sur la Littérature Contemporaine' (1863–89); 'Diderot' (1880), and the posthumous 'Etudes sur la Littérature au XVIIIe Siècle' (1891). He also wrote a biography of Melchior Grimm (1887). Consult the study by Gérard (1890); article by Dowden in the *Fortnightly,* Vol. XLV (1889); Fisher, 'A Group of French Critics' (1897).

SCHERESCHEWSKY, skĕr-ĕs-kūs'kĭ, **Samuel Isaac Joseph,** American Protestant Episcopal bishop: b. Tanroggen, Lithuania, Russia, 6 May 1831; d. Tokio, Japan, 1906. He studied in Russia and Germany, and, after coming in 1854 to the United States, at the Western Theological Seminary (Allegheny, Pa.) and the General Theological Seminary; was ordained deacon of the Protestant Episcopal Church in 1859, priest in 1860 and was a missionary in China in 1860–75. In 1877 he was consecrated third Protestant Episcopal bishop of China, but he resigned his office in 1883 and afterward resided in the United States, China and Japan. With J. S. Burden he translated the 'Book of Prayer' into Mandarin, and he also prepared a complete revision of the Mandarin Bible (1895) and a wholly new rendering of the Bible into Wenli, the classical language of China (1902).

SCHERMERHORN, skĕr'mĕr-hôrn, **Martin Kellogg,** American Unitarian clergyman: b. Durham, N. Y., 20 March 1841. He was educated at Williams College and at Union Theological Seminary, was ordained to the Presbyterian ministry in 1867, held Unitarian pastorates in 1871–84 and Protestant Episcopal rectorships in 1885–96 and returned to the Unitarian ministry in 1897. He has published 'Ancient Sacred Scriptures' (1882); 'Sacred Scriptures of the World' (1898); 'Thoughts for the Twentieth Century' (1900); 'Universal Worship' (1904); 'World-Religion' and 'World-Religion Hymns and Prayers' (1914), etc.

SCHERR, shĕr, **Johannes,** German author and literary critic: b. Hohenrechberg, Swabia, 3 Oct. 1817; d. Zürich, Switzerland, 21 Nov. 1886. He was educated at the University of Tübingen and in 1843 settled in Stuttgart, where he became a teacher. He allied himself, politically, with the Democrats among whom he became a leader; in 1848 he was elected to the assembly and in the revolution of that year he took so prominent a part that he was compelled to flee to Zürich in 1849. He was appointed professor of history and literature in the University of Zürich in 1860, holding the position until his death. His works are characterized by their caustic wit and many peculiarities in point of diction. His writings include 'Geschichte der deutschen Literatur' (1854); 'Michel, Geschichte eines Deutschen unserer Zeit' (1858); 'Deutsch Kulturund Gittengeschichte' (1852); 'Geschichte der deutscher Frauenwelt' (1860); 'Blucher, seine Zeit und sein Leben' (1862–63), etc.

SCHIAPARELLI, skyä-pä-rĕl'lē, **Giovanni Virginio,** Italian astronomer: b. Savigliano, 5 March 1835; d. Milan, 5 July 1910. He was educated at the University of Turin, and later studied at Berlin, under Encke, and at Pultowa, Russia, under Struve. Returning to Italy in 1859, he became assistant astronomer at the Milan Observatory, and its director in 1862. In 1861 he discovered the asteroid Hesperia. His discoveries of the relations between comets and falling stars were published as 'Note e riflessioni sulla teoria astronomica dele stelle cadenti' (1867). In 1877 he published the first accounts of his observations of the "canals" of Mars, to which his name has been given. He published many books on astronomy.

SCHIAVONE, skyä-vō'nā, **Andrea** (The Slavonian), Italian painter whose original name was Meldolla (Medolla or Medula): b. Sebenico, Dalmatia, probably in 1522; d. Venice, 1582. In youth he was placed with a house-painter in Venice, where in leisure hours he studied the works of Parmegiano, Giorgione and Titian. The latter took him under his care, and later employed him in the library of Saint Mark, where he is said to have painted three entire ceilings. Later he was accounted one of the finest colorists of the Venetian school. Among his works are two parables and two landscapes in the Berlin Museum, 'Christ before Pilate' in the Venice Gallery, 'Christ before Caiaphas' (Vienna), 'Parnassus' (Munich), and numerous other specimens to be seen in collections at Florence, Rome, Naples, Dresden, Paris and Petrograd. His 'Perseus and Andromeda' and 'The Apostles at the Sepulchre' are in the royal collection at Windsor. He also etched 119 plates, making use of some soft material, probably tin.

SCHIEDAM, shē-dăm', Netherlands, in the province of South Holland, a seaport near the influx of the Schie into the Maas, four miles west of Rotterdam. Of the old walls four gates have been preserved. The town is intersected by numerous canals, and though irregularly built has broad streets and many good houses. Its chief buildings are the Reformed and other churches, a fine exchange, town house, a handsome concert hall, schools of language, art, business, etc., a public library and various hospitals. The principal manufacture is the Geneva gin or Hollands. Prior to the World War there were over 220 grain and other distilleries in constant operation. Other manufactures were linen, thread, copper and iron castings, white lead and litharge, cordage and vinegar. There was considerable traffic in gin, grain and coal. Pop. about 35,166.

SCHIEFFELIN, shĕf'ĕ-lĭn, **Bradhurst,** American druggist and publicist: b. New York, 21 Sept. 1824. He entered the wholesale drug manufacture, and in 1860 placed petroleum on the market. During the Civil War he organized a committee of prominent citizens for consultation with and support of President Lincoln, and in the financial troubles succeeding the war was active in charities. The Bread and Shelter Society, for sending destitute persons from cities to rural districts for their self-support, was organized by him, and he personally sheltered and fed thousands. With Charles O'Connor and Horace Greeley he formulated the petition introduced into Congress by Roscoe Conkling, for the prevention of the appropriation for the use of religious corporations of public moneys or property.

SCHIFF, shĭf, **Jacob Henry,** American banker: b. Frankfort-on-the-Main, Germany, 1847; d. 25 Sept. 1920. He came to New York in 1868, where he entered a banking house and became in a few years head of the firm of Kuhn, Loeb and Company. His leadership in finance was quickly acknowledged and his firm has been identified with many prominent enterprises. He has devoted a large portion of his wealth to charitable and educational purposes and among his most noted benefactions are the Semitic Museum at Harvard University, and in New York the Nurses' Settlement, the Young Men's Hebrew Association building and the Jewish Theological Seminary. He is president of the Montefiore Home for Chronic Invalids of New York; vice-president and trustee of the Baron de Hirsch Fund; member of the American Museum of Natural History; the Metropolitan Museum of Art; the American Society of Fine Arts, and is an ex-vice-president of the New York Chamber of Commerce. He has long been associated with movements for civic reform.

SCHILLER, shĭl'lĕr, **Ferdinand Canning Scott,** English philosopher: b. 1864. He was educated at Balliol College, Oxford, and at Cornell University. In 1893–97 he was an instructor at Cornell; afterward returning to Oxford, where he was tutor and Fellow of Corpus Christi College after 1903. He gained a wide reputation as an exponent of pragmatism, which he discusses under the term humanism. He contributed to magazines and reviews and was author of 'Riddles of the Sphinx' (1891); 'Humanism' (1903; 2d ed., 1912); 'Plato or Protagoras?' (1908); 'Formal Logic, a Scientific and Social Problem' (1912), etc.

SCHILLER, Johann Christoph Friedrich (von), German dramatist, poet, historian and philosophic thinker: b. Marbach in Swabia, 10 Nov. 1759; d. Weimar, 9 May 1805. His father was an officer in the army of the Duke of Württemberg, his mother a pious housewife nowise distinguished above her kind. The parents early decided to fit their son for the priesthood in the Lutheran Church. To this end they sent him to the Latin school at Ludwigsburg, which was then the ducal residence. Duke Karl Eugen was conspicuous among the German princelings who aped the style of the Bourbon kings, Ludwigsburg being his Versailles. Here he maintained a costly opera, spent large sums on building projects and governed through mistresses and adventurers. The boy Schiller had thus a good opportunity to observe the ways of petty autocracy under the old régime, and he used his eyes to good advantage. Presently the duke experienced a change of heart, became an exponent of virtue and went in for works of benevolence. In this spirit he founded a military academy which was to train the sons of his officers for the public service. That he might have the boys under his own eye and mold them to his liking, he assembled them under his own roof in his castle «Solitude,» where for a time he played the schoolmaster with them. His offer of a scholarship to the boy Schiller was a princely favor not to be rejected by the loyal parents, though it involved giving up their plan of making him a pastor. To this school the lad went in 1773 and started in as a student of law, but floundered badly at first. After two years the school was transferred to Stuttgart, where it became virtually a university minus the theological faculty. A medical faculty was now added, and to secure students certain *élèves* (French was the official language of the school) were allowed to go over to medicine. Schiller, who had been at the foot of his class, eagerly accepted this chance. From this time (1775) on he devoted himself with average assiduity and success to medical studies. In 1780 he was honorably dismissed, but without a doctor's degree.

The discipline of the school was severely military. The students were kept under constant surveillance, their reading was censored and their quarters often searched for contraband books. But they found ways to smuggle in the forbidden literature, which of course tasted the sweeter for the prohibition. It is certain that young Schiller read nearly all the revolutionary productions — works of the so-called «storm and stress,» — that were just then coming out. They soon raised his incipient radicalism to the boiling-point. A friend called his attention to a magazine story by Schubart dealing with a pair of enemy brothers, a theme just then in favor with the literary radicals. The hint was enough. Schiller, who by this time felt sure that the writing of tragedy was to be his vocation, began to pen his 'Robbers,' in which a dissolute but soft-hearted young nobleman named Karl von Moor, while leading a wild life as a Leipzig student, receives a harsh letter from his dotard father telling him that he is disinherited. Driven to fury by the missive and not suspecting the machinations of his scoundrel brother, Franz, he puts himself at the head of a band of scapegrace students and leads them to the Bohemian Forest, where they become outlaws and run amuck against society. Moor robs and murders on a terrific scale, yet not for vulgar gain. He tries to correct the inequalities and injustices of the social order, imagining that he is doing a righteous work as the avenger of the poor and oppressed, and fully believing that God is on his side. When he learns the truth he gives himself up to the law which he has outraged. Thus the play is a tragedy of fanaticism, and as such it marks the emergence of a new dramatic type. It has glaring faults of extravagance and overemphasis, but is none the less the work of a born dramatist, all clearly visualized for action and powerfully bodied forth. It was chiefly the fame of this thunderous play that led, in the course of time, to Schiller's being made an honorary citizen of the first French republic. There is an authentic tradition that in reading the scenes of the nascent 'Robbers' to his spellbound fellow-students, he would sometimes snort and roar and stamp in the white heat of his indignation.

Toward the end of 1780 he left the academy and was made army doctor to a regiment of invalid soldiers stationed at Stuttgart. The service was disagreeable and poorly paid. To increase his pittance of an income he borrowed money and published the play he had written, letting it appear anonymously as a book for the reader. It made no great stir as mere literature, but caught the attention of Dalberg, director of a theatre at Mannheim, who suggested a revision for the stage. Schiller complied and the new version was played at Mannheim in 1781 with memorable success. The audience went wild over the performance and the obscure army doctor at once emerged into the glare of notoriety, though he had saddled himself with a debt which was destined to afflict him for years. After such a success he was naturally disposed to try again. He wrote a second play, on the abortive conspiracy of Fiesco at Genoa in 1547, conceiving it at first rather vaguely as a «republican tragedy.» Meanwhile he had got into serious trouble with his lord and master, the duke. In the first place, he had left his post without permission in order to attend the first performance of the 'Robbers' at Mannheim. Secondly, a passage in the published play had given offense in Switzerland and led to public complaints. The result was that Schiller was given two weeks in the guardhouse and forbidden to write any more «comedies.» This was too much. He decided to quit Württemberg. One evening in September 1782 he stole away clandestinely with a friend named Streicher, a musician who afterward published an account of the episode. Under assumed names the pair went first to Mannheim, where Schiller read his new 'Fiesco' to Dalberg's actors and received the humiliating verdict that it was worthless and could not be played. He had ruined its effect by his bad reading, and besides that the politic Dalberg was in no haste to befriend a runaway who had quarreled with the ruler of a neighboring state. Schiller was now technically a deserter and had very good reason to fear that he would be pursued and put under arrest. So he took refuge at Bauerbach, near Meiningen, occupying a house that had



STATUE OF SCHILLER, BY BEGAS, BERLIN

been put at his disposal by a friendly lady named Henriette von Wolzogen. At first he went under the name of Dr. Ritter and scattered misleading letters as to his whereabouts, but his friends soon learned where he was and it became evident that the Duke of Württemberg was taking no steps to have him arrested. Being now free for his favorite employment, he wrote a third play, which he at first called 'Luise Miller,' afterward 'Cabal and Love,' and sketched a fourth, which was to be known as 'Don Carlos.'

In the summer of 1783 he returned to Mannheim under a year's contract as theatre-poet, Dalberg having become convinced that there was no danger to be feared from Stuttgart and hoping that the new plays would repeat the huge success of the 'Robbers.' In due time 'Fiesco' was put on the stage with moderate success, but not as a «republican tragedy.» By a stroke of the pen its author had given it a happy ending. Instead of being slain as a selfish usurper by the fanatical republican Verrina, Fiesco is made, in the moment of his triumph, to cast off his ducal robes and bid the Genoese embrace him as their happiest fellow-citizen. This ending clearly supports the republican idea, but we are hardly prepared for such a turn by the preceding trend of the play, which makes Fiesco continually vacillate between republican idealism and the lure of personal aggrandizement. 'Cabal and Love' is a tragedy of class-conflict and incidentally a drastic comment on the ways of German courts and courtiers. A high-minded nobleman falls in love with a fiddler's daughter and wishes to marry her in spite of her humble birth. But his father, who has risen by crime to the presidency of the ducal council, will have none of such a misalliance and concocts a vile plot to force his son into a marriage with the duke's mistress. This is the «cabal.» The plotters succeed in making Ferdinand madly jealous, so that he poisons Luise and then commits suicide. In writing the play Schiller had the Württemberg court in mind, and little touches here and there reflect actual history. But the duke himself does not appear and there are no telltale names. 'Cabal and Love' has many strong scenes and is the only class-conflict play of that epoch which is still alive on the German stage. But its effect is marred at the last by the fatuous conduct of the tongue-tied heroine, who forfeits sympathy by her seeming lack of common sense.

The three plays just considered, all written in prose and characterized by a vehement, high-keyed diction, are the most important yet not the sole expression of Schiller's youthful radicalism. While still living in Stuttgart he started a magazine called the *Württemberg Repertory,* for which he wrote a number of minor papers. He also published a so-called *Anthology for the Year* 1782 containing numerous short poems. The dominant note of Schiller's early verse is a certain high-pitched vehemence which is apt to suggest poetic feigning. He is as far as possible from the simple realistic manner of the young Goethe, having a marked fondness for soaring and sonorous diction.

At the end of his first year in Mannheim the contract with Dalberg was not renewed, so that Schiller found himself in the summer of 1784 without income and without prospects. He was oppressed by debt and generally unhappy. Mannheim had become a prison. He decided to try his fortune by starting a dramatic magazine to be known as the *Rhenish Thalia,* but hardly had he launched it when he was called away from the Rhine country by a friendly message from Gottfried Körner, a young lawyer just then living in Leipzig. After a short sojourn in the university town Schiller followed his new-found friend to Dresden, where he remained nearly two years in intimate association with the Körner family. He continued to publish his magazine, now called simply *Thalia,* and at the same time worked in a desultory fashion on his 'Don Carlos.' This he had originally planned as a love-tragedy in a king's household, purposing incidentally to scourge the Spanish Inquisition. But the mood of the revolutionist and special pleader gradually gave way to the serener ambition of the poet and he decided to write his new play in verse, as Lessing had lately done in the case of 'Nathan.' In the illusory hope of receiving valuable criticism he began to publish it piecemeal in successive numbers of the *Thalia.* As he worked his mind changed, important characters began to appear in a new light and the centre of gravity shifted. The result was that the very long play completed in 1787 was something very different from the one he had conceived four years before. 'Don Carlos' is a tragedy of political idealism wrecked by a passion for intriguing methods and would-be heroic foolhardiness. The weightiest character is not the nominal hero, but the Marquis Posa, who pleads with Philip II of Spain to grant the Netherlanders freedom of thought and to end the Spanish régime of force and terrorism. Posa is a humane idealist of the 18th century and voices Schiller's own convictions as matured by his intercourse with Körner. Viewed in its relation to its author's personal development 'Don Carlos' occupies a middle position between the rather crude realism of his early prose plays and the matured art of his later and more famous poetic dramas. In 'Don Carlos' his peculiar sonorous diction begins to show itself at its best. But the play as a whole suffers from a lack of simplicity and clearness. It is too long and complicated for the three hours' traffic of the stage.

In the summer of 1787 having tired of his dependence on Körner, Schiller decided to try his fortune in Weimar, whose duke had previously given him the title of councillor. Goethe was then in Italy, but the visitor soon made the acquaintance of Herder and Wieland. Ere long he decided to settle in Jena and devote himself to the writing of history. He had now lost touch with the stage and his experience with it had been on the whole disappointing. On the other hand, he had become very much enamored of historical study, and his reading for 'Don Carlos' had given him a special interest in the great Dutch-Spanish conflict of the 16th century. He planned a bulky treatise of six volumes on the subject, but only wrote one. It was published in 1788 under the title 'Defection of the Netherlands.' The book is brilliantly written, the author's sympathies being obviously with the Dutch in their struggle for freedom, and contains a number

of splendid literary portraits. But Schiller got his information rather easily and made no very careful study of the sources. His merit as a historian has been often attacked and as often defended. At any rate he made literature out of history, the first achievement of that kind in the German language. His success as a historian led to his appointment, through Goethe's influence, to a professorship at the University of Jena. But hardly had he entered on his academic duties when a dangerous illness shattered his health. He never fully recovered, but led henceforth the circumspect life of a semi-invalid. A gift by the Duke of Augustenburg freed him temporarily from pecuniary anxieties — he was now married to the dowerless Charlotte von Lengefeld — and he resolved to devote his freedom to the study of Kant. He felt that critical thinking had largely destroyed his imaginative spontaneity and that the only possible cure lay in a further study of fundamentals: the "rules" must repair the damage they had wrought. So for several years he devoted himself about equally to history and philosophy, writing rather copiously in both fields. In the former we have his 'History of the Thirty Years' War,' which he conceived as a revolt of the Protestant princes of Germany against the centralizing despotism of the house of Hapsburg. It is eminently readable, especially where it treats of the great Swedish king who is Schiller's hero. He also wrote a number of minor historical papers. To enliven the columns of his *Thalia* he published in it his one attempt at prose fiction, the 'Ghostseer,' a fragmentary yarn which exploits various phases of contemporary interest in the supernatural. It is fair to call it a yarn because he himself never took it seriously and even called it a "Sudelei." In general, this period of Schiller's life is rather barren of poetic production. To it belong, however, the 'Gods of Greece' and the 'Artists,' two of his weightiest and most famous poems. The former is an elegy on the lost beauty of Greek polytheism, the latter a glowing tribute to the influence of art in the upward evolution of human kind. In the philosophic domain Schiller devoted himself mainly to the theory of beauty and its relation, on the one hand to art, on the other to conduct. Setting out from Kant's analysis of beauty in the 'Critique of Practical Judgment,' Schiller reached the conclusion that beauty is fundamentally freedom-in-the-appearance. He set forth his doctrine and its implications in a number of rather forbiddingly abstruse essays, of which the most interesting one, perhaps, is that entitled 'Uber Anmut und Würde' ('On Winsomeness and Dignity'). In a more popular and readable form his philosophy of art is expounded in his 'Letters on Esthetic Education' and his famous essay on 'Naive and Sentimental Poetry.'

In 1794 began the famous friendship of Schiller and Goethe. For seven years the two men had lived as mutually indifferent neighbors, each acquainted with the other's work but neither caring for a closer relation. A casual meeting at a scientific lecture put an end to this mutual aloofness, explanations and visits ensued and ere long they were close friends and literary allies. Goethe became a frequent contributor to Schiller's magazine *Die Horen* and took a keen interest in its success. But it did not succeed and after three years was discontinued. It was largely their irritation over this failure that led the two men to unite in the literary campaign of the 'Xenia,' a collection of epigrams in the ancient distich form, wherein they paid their respects to men and tendencies they did not like. Nearly a thousand of the distichs were written and about half that number were published in 1797 in Schiller's *Musenalmanach*, where they caused great excitement. There was a shower of 'Anti-Xenia,' to which the perpetrators of the original "Teufelei" (as they called it) paid no attention. They agreed that the published 'Xenia' should be included in the works of both, and that they would give no information as to their separate authorship. Some of the epigrams are sharply censorious, others without any sting at all. The majority, relating as they do to men and matters of ephemeral interest, now seem rather pointless. Their chief historical importance is that they caused Schiller and Goethe to be generally regarded as militant allies fighting the same battle. The two men came to be known as the Dioscuri.

Schiller had now definitely returned to poetry. In conjunction with Goethe he made a study of the epic style and out of this study grew a number of ballads and romanzas which are among the most popular of his works. Special favorites of those who enjoy this phase of Schiller's art are the 'Diver,' the 'Pledge,' the 'Glove' and the 'Cranes of Ibycus.' To this period belong also a group of reflective poems in which he gave expression to the humane idealism and high ethical aspiration which characterize his mature thinking. In this domain he is at his best in the 'Ideal and Life,' the 'Walk' and the 'Song of the Bell.' But his fame rests mainly on his poetic dramas. As director of the little Weimar theatre Goethe was glad to avail himself of his friend's insight and experience in matters of the stage. Schiller, who became a resident of Weimar in 1799, gave assistance in selecting and adapting plays and gradually enriched the local repertory with five creations of his own which are the pride of the German classic drama. He began 'Wallenstein' in 1796, at first purposing to make it a play of ordinary length. The material proved refractory since it dealt only with what Schiller called the cold passions (ambition, hate, malice, vindictiveness), and also because it involved idealizing and creating dramatic sympathy for a traitor. Schiller met the first difficulty by inventing a pair of romantic lovers and managing the plot in such a way that the spectator is forced to see Wallenstein through their partial eyes; the second by giving to Wallenstein a certain loftiness of soul, making much of all the extenuating circumstances and surrounding him with inferior men among whom he towers like a giant among pigmies. The result is that a rather repellant character becomes grand in his final isolation and pitiful downfall. On the whole Wallenstein is the most impressive tragic hero created by any German dramatist. As Schiller's interest in the man and his times deepened the material grew on his hands until he decided to present it in three parts called 'Wallenstein's Camp,' the 'Piccolomini' and 'Wallenstein's Death.' It is, however, no

trilogy in the Greek sense, but a portentously long tragedy in 10 acts, preceded by a dramatic prologue.

Next came 'Mary Stuart,' indubitably the best for the stage of all the many plays in divers languages dealing with the famous Queen of Scots. Here the problem, as Schiller saw it, was to create genuine tragic sympathy for his heroine, but without extenuating her conduct and so making a distinctly Catholicizing play. He solved the problem by concentrating the plot into the last few days of Queen Mary's life and introducing her as a woman whose conscience is heavily burdened by the admitted crimes of long ago, but who feels that in her present plight she is the victim of rank injustice. As she is helpless to avert her impending fate, her situation, according to Schiller's conception of dramative art, is pathetic rather than tragic. It was necessary to make her in some sense visibly responsible for her calamity. To meet this dramaturgic difficulty Schiller resorted to two unhistoric inventions: first, Queen Mary's attempt to escape at the instigation of the Catholic renegade, Mortimer, this attempt endangering the life of Queen Elizabeth; secondly, a meeting of the two queens at which Mary loses control of herself and puts a deadly insult on her rival. This scene is the stage-climax of the play, but its psychological climax comes in the fifth act, when Queen Mary humbly accepts her ignominious death as a divinely appointed expiation for the sins of long ago. While the play's appeal is thus shifted from politics to religion and made to rest on a purely human basis that is neither Catholic nor Protestant, there is much in it that indicates Schiller's artistic sympathy with the Catholicizzing tendency of the new romatic movement just then acquiring momentum. The portrait of Elizabeth is little better than a caricature.

Still more marked is the Catholicizing drift in the 'Maid of Orleans,' which was given the subtitle of "romantic tragedy" for the very reason that it requires us to accept the supernaturalism of the legend at its face value. Schiller follows the tradition rather closely except that he makes Joan's "voices" enjoin virginity as a condition of success in her patriotic mission, and that he departs radically from history in respect to the manner of her death. In his view of the matter tragic guilt of some kind was indispensable to tragedy; so he makes Joan fall strangely in love with the English general Lionel just as she is about to take his life on the battle-field. From that instant, feeling that she has violated the spirit of the divine command, she loses her self-confidence and with it her supernatural power. After great suffering and humiliation, which supposedly expiate her offense, she recovers her power by a miracle and dies in glory on the field of battle fighting for France. In this bold romanticization of the Maid's character it was Schiller's deliberate intention to idealize her and rescue her from the obloquy cast upon her by Voltaire's 'La Pucelle.'

His next play was the 'Bride of Messina,' in which he attempted to find a substitute for the Greek chorus. He invented a mediæval plot in which two brothers fall in love with the same girl, who is in reality their sister. She has been brought up in seclusion, her existence unknown to them, in order to defeat the dire prediction of soothsayers. Jealousy and mutual antipathy lead on to the death of both. Schiller provides each brother with a band of retainers who take part in the action and also function as semi-choruses, each speaking through a chosen leader. In what they say an attempt is made to imitate the detached attitude and lofty moralizing of the Sophoclean chorus. Schiller's noble poetic diction is at its very best in the 'Bride of Messina' and especially in the so-called choral passages; but it is evident that words spoken by one person, without group-singing or group-dancing, could convey hardly more than a dim suggestion of the old Greek chorus. Schiller's example has not been imitated and the 'Bride of Messina' is but rarely played.

Last came 'William Tell,' the most popular of all Schiller's plays. It is this stirring and intensely human drama dealing with the revolt of the Swiss farmers against the tyranny of their Austrian governors that has led to the idealization of its author as poet of freedom. It has no hero but the Swiss people, it lacks unity, it violates several of the most approved rules of dramaturgy. Yet there is an appealing charm about it which seldom fails to please, whether it is read as literature or seen upon the stage. After the completion of 'William Tell' in 1804 Schiller addressed himself to a new play on the story of the false Demetrius, reputed son of Ivan the Terrible. He made careful studies of Russian history, sketched numerous scenes and completed the better part of two acts. In the midst of this work on 'Demetrius' he contracted the illness which led to his premature death.

Schiller has always been regarded as the greatest of German dramatists. He had but little of the lyric gift and wrote no songs that have become highly popular. Fastidious critics have often taxed him with being a rhetorician rather than a poet, but anything like posing or insincerity was quite foreign to his nature. His personal character endeared him to all who knew him and he lived his life on a high plane of thought and feeling. His aspiring idealism has always appealed particularly to the young; so that his writings, popularized by school and theatre, are, or at least were, for the Germans a great educative force. His name, linked habitually with Goethe's, stands for all that is best in the best epoch of German letters. See SONG OF THE BELL; WALLENSTEIN; WILLIAM TELL.

Bibliography.— There is a vast quantity of literature pertaining to Schiller; consult Vol. V of Goedeke's 'Grundriss zur Geschichte der deutschen Dichtung' and the survey in the Appendix to Thomas's 'Life of Schiller.' Only a few outstanding titles can be mentioned here, and these, owing to blockade conditions created by the Great War, must be restricted to works that were published prior to its beginning.

The first complete edition of Schiller's works was that of his friend Körner, 12 vols., 1812–15. This formed the basis of the later Cotta editions which appeared in different forms and different degrees of completeness. Down to about 1868 these were rather uncritically edited. Between 1868 and 1872 appeared the Historisch-kritische Ausgabe, 15 vols., edited by Goedeke and others. To the same period belongs the

cheap popular edition issued by Hempel, in Berlin — well edited but unsightly. Good later editions are those of Boxberger and Birlinger, forming part of Kürschner's Deutsche National-Literatur, 12 vols., and of Bellermann, 14 vols., 1895 ff. Of special merit is the Säkular-Ausgabe, 16 vols., 1904. The numerous letters of Schiller, where his style was at its best in Goethe's opinion, have been well edited by Jonas, 7 vols., 1892 ff. Editions of the separate plays, issued by competing publishers for school and college use, are numerous but cannot be listed here.

Biographies short and long are almost legion. Of the early ones those by Carlyle (1825) and by Karoline von Wolzogen, the poet's sister-in-law (1830), are still interesting, as is also the booklet 'Schiller's Flucht von Stuttgart' (1836) by his friend and fellow-traveler, Streicher. Between 1838 and 1842 Hoffmeister brought out his monumental treatise in five volumes, which was followed by the shorter work of Viehoff (1846) and Schaefer (1853). The centenary jubilee of 1859, at which Schiller was glorified as the poet of freedom by Germans all over the world, brought forth a mass of more or less eulogistic literature. Of the longer biographies dating from this epoch of Schiller enthusiasm the best is that of Palleske (1858–59), of which an English translation by Lady Wallace was published in 1860. Less fervid and also less readable are the biographies by Düntzer (1881) and Hepp (1885). Highly learned biographies, going deep into all sorts of minutiæ, were begun by Minor (2 vols., Berlin 1890) and by Weltrich (three instalments in one volume, 1899), but have remained unfinished. The same is true of the less exhaustive work of Brahm (Vol. I, 1892). An excellent illustrated life of Schiller is that of Wychgram (1891). Of solid merit also is the little book of Harnack (1898), the larger one by Kühnemann (5th ed., Munich 1914) and the two-volume treatise by Berger (8th ed., Munich 1914). In English, aside from translations, there are short biographies by Boyesen (New York 1882), Sime (Edinburgh 1882) and Nevinson (New York 1889); also a longer one by Thomas (New York 1901). The best translations of the poems are those of Bulwer Lytton (London 1844) and Arnold Foster (1902).

Noteworthy special studies (but the list is far from complete) are the following: Bellermann, 'Schiller's Dramen' (2 vols., 1898–99; 3d ed., 3 vols., Berlin 1905–08); Köster, 'Schiller als Dramaturg' (Leipzig 1891); Tomaschek, 'Schiller in seinem Verhältnisse zur Wissenschaft' (1862; which won a prize offered by the Vienna Academy); Harnack, 'Die klassische Aesthetik der Deutschen' (Berlin 1892); Rieger, 'Schillers Verhältnis zur französischen Revolution' (Berlin 1885); Wilm, 'The Philosophy of Schiller in its Historical Relations' (Boston 1913), and Ludwig, 'Schiller und die deutsche Nachwelt' (Berlin 1909).

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SCHILLER, *in mineralogy,* a peculiar lustre due to reflection from the surfaces of minute enclosed crystals, probably of goethite. It is best illustrated by sunstone (q.v.), and is also noticed in bronzite, hypersthene and labradorite.

SCHILLING, shĭl'lĭng, **Johannes,** German sculptor: b. Mittweida, Saxony, 23 June 1828; d. 1910. He studied art at Berlin and Dresden. In 1868 he became professor at the Dresden Royal Academy. His chief works include the 'Four Seasons' at Dresden, statues of Schiller at Vienna, of Maximilian at Trieste, the War Memorial at Hamburg and the German National Monument on the Niederwald, opposite Bingen on the Rhine, which bears a colossal figure of Germania, and the statue of Wilhelm I at Wiesbaden (1894).

SCHINDLER, shĭnd'lẽr, **Solomon,** American rabbi: b. Niesse, Silesia, 24 April 1842; d. 5 May 1915. He came to America from Westphalia in 1871, having been for some years out of sympathy with orthodox Judaism, and, after a period of struggle in his adopted country, became known as one of the leaders of the advance movement among Hebrew religionists. He was called to the congregation of Adeth Israel in Boston, Mass., in 1884. In this pastorate he continued nearly 20 years, during which time he not only helped to liberalize the Hebrew faith but to promote a better understanding between American Hebrews and Christians than had before existed. In 1895–99 he was superintendent of the federated Jewish charitable organizations of Boston; in 1899–1909 superintendent of the Leopold Morse House; he then retired. He was author of 'Messianic Expectations and Modern Judaism'; 'Dissolving Views of the History of Judaism'; 'Young West, a Sequel to Bellamy's Looking Backward,' etc.

SCHINKEL, shĭn'kĕl, **Karl Friedrich,** German architect and painter: b. Neuruppin, Brandenburg, 13 March 1781; d. Berlin, 9 Oct. 1841. He was educated at the gymnasium of his native town, and after 1795 in that of Berlin. He became a pupil of Professor Gilly, and on the death of the latter in 1798 succeeded to his private practice as an architect. At the same time he continued his studies, and in 1803 he went with this object to Italy, returning in 1805 by way of France to Berlin. The period of the war being unfavorable for architecture, he took to landscape painting, and from 1808 to 1814 painted a series of dioramas for Gropius. On the return of the royal family to Berlin some of his designs for alterations in the palace were adopted and carried out. In 1811 he was admitted to the Academy, and in 1820 became a professor at the Academy. The designs to which chiefly he owed his architectural reputation include those of the royal guardhouse, the 'Memorial' of the War of Liberation, the new theatre, the new Potsdam Gate, the artillery and engineers' school, all in Berlin; and the observatory; the casinos in Potsdam and Glienicke; and a large number of castles, churches and minor public buildings. As a painter he produced numerous wall and easel pictures. His 'Primeval History of Mankind' in the vestibule of the Berlin Museum exhibits him to advantage as a wall painter. His landscapes are chiefly architectural views, of which the best known are the 'Theatre at Taormina'; 'Square of Saint Mark's, Venice'; 'Ocean Caves near Sorrento'; 'The Cathedral at Milan'; 'Interior of Saint Peter's, at Rome'; 'The Capitol by Moonlight.' He exercised a profound influence over every department of the art production of his day, including carpet and furniture making. His taste was strictly classical, but while he reproduced some of the purest forms of Greek art of the Periclean Age, he also occasionally chose the motifs both of mediæval and Renaissance architecture as elements in his designs. These designs, with his own comments and explanations, were published in different forms, his principal work being 'Sammlung architektonischer Entwürfe' (1820).

SCHIPKA PASS. See SHIPKA PASS.

SCHIPPERKE. See TERRIER.

SCHIRMER, shĭr'mẽr, **Johann Wilhelm,** German artist: b. Jülich, Rhenish Prussia, 5 Sept. 1807; d. Carlsruhe, 11 Sept. 1863. He studied historical painting under Schadow at the Düsseldorf Academy until he came under the influence of Lessing's landscapes, whereupon he turned to that *mêtier,* producing historical landscapes after the manner of Poussin. In 1830 he became assistant professor, and in 1839 professor at the Düsseldorf Academy, meantime visiting and painting in Belgium, the Black Forest, Switzerland, Holland, Normandy and Italy. In 1853 he became director of the art school at Carlsruhe. Among his works are six Biblical landscapes, with the 'Life of Abraham,' National Gallery, Berlin; 'Grotto of Egeria,' 'Nether German Landscape,' Leipzig Museum; series of 26 Biblical landscapes, Düsseldorf Gallery; 'Via Mala,' four landscapes with story of Good Samaritan; 'Storm on the Campagna,' Carlsruhe Gallery.

SCHIST (crystalline), a metamorphic rock generally found only in regions which have been subjected to regional or dynamic metamorphism, that is, those in which the strata have suffered intense folding and shearing. The general characteristics of schists are the fine and pronounced lamination, and crystalline character of component material. They grade on the one hand into gneisses and on the other into scarcely altered mica slates or sandstones. The more important varieties are broadly classified, according to the principal ferro-magnesian silicate present. Thus we have: (*a*) Mica schists; (*b*) Hornblende schists or Amphibolites, and (*c*) various minor schists. The mica schists range in silica from over 80 per cent to less than 50 per cent, according to the amount of quartz present. The most prominent and abundant minerals of this variety are quartz, muscovite and biotite, which are more or less distributed in layers. Among the other minerals present are feldspars, both orthoclase and plagioclase, the rock thus approaching gneiss; garnet, often in large and well-formed crystals; staurolite, cyanite, sillimanite, tourmaline, varying from black through blue, green, red, to white, often of the precious type; opalite, pyrite and magnetite. The term Hydromica schists is used commonly for the finer varieties, in which the scales of mica are indistinguishable (sericite, peragonite, etc.). These pass imperceptibly into phyllites. Mica schists result largely from the metamorphism of sandstones, shales and clays, but also through crushing and excessive shearing of igneous rocks. They are found over wide areas in New England, the Appalachians, Lake Superior and the West. The Hornblende schists or Amphibolites generally result from the dynamic metamorphism affecting igneous or pyroclastic rocks, and rarely from ordinary sedimentary rocks. Hornblende here takes the chief place, quartz being normally absent, while biotite and the basic feldspars are characteristic constituents. Garnet, magnetite, pyrite and other basic minerals are also common. These schists occur as belts in other metamorphic rocks, generally representing dikes, sheets, flows, or ash beds in the sedimentary series. They occur in New England and other Eastern States, and are important in the mineral regions of Lake Superior. They also occur in the Black Hills, and in the Rocky Mountain and California ranges. Among the minor schists may be mentioned chlorite schist, talc schist, epidete schist and others. In each of these, the mineral giving name to the rock is more or less admixed with quartz, feldspars and numerous other minerals. They probably result most commonly from the alteration of igneous rocks, and are found in the older metamorphic districts. See FOLIATION; METAMORPHISM.

SCHIZÆA, skĭ-zē'a, the typical genus of the family *Schizæaceæ,* ferns widely distributed, mostly in tropical regions, and which are small and distinct in habit. The sporangia have an entire apical ring and are sessile in close distichous spikes along the middle veins of the narrow pinnæ of the fertile fronds; the sterile fronds are linear, fan-shaped or dichotomously many-cleft. *S. pusilla,* the curly-grass, is the only species in North America, and is very rare and local, being found only in the pine-barrens of New Jersey and Nova Scotia. Its fertile one-sided fronds form the most conspicuous part of this tiny plant, the twisting linear sterile fronds being very like grass. See FERNS AND FERN ALLIES.

SCHIZOPODA. See CRUSTACEA; OPOSSUM-SHRIMP.

SCHLATTER, shlät'tẽr, **Michael,** American German Reformed clergyman: b. Saint Gall, Switzerland, 14 July 1716; d. near Philadelphia, Pa., November 1790. He was educated at the University of Helmstedt, taught for several years and then entered the German Reformed ministry. He offered his services as a missionary to the German Reformed emigrants in Philadelphia in 1746, and went to Pennsylvania in that year. He served as pastor of the united churches of Germantown and Philadelphia in 1746–51, organized a synod which met in Philadelphia in 1747 and made extended missionary tours through Pennsylvania, Maryland, Virginia, New Jersey and New York. He visited Europe in 1751, secured a much needed reinforcement of six young preachers, substantial aid in the way of money and returned in 1752. As a result of his appeal £20,000 was raised in England and Holland for the establishment of schools among the Germans in America, and in 1755 Schlatter became superintendent of the enterprise, but in 1757 he resigned because of the opposition encountered from the Germans, who objected to the teaching of the English language in the schools. In 1757 he was appointed chaplain of the Royal American regiment, and

remained with the army until 1759. He then preached at Chestnut Hill and surrounding places. In 1777, while still attached to the royal army, he refused to obey orders on account of sympathy with the colonial cause and was imprisoned. Consult Harbaugh, Henry, 'Life of Rev. Michael Schlatter' (1857).

SCHLEGEL, shlā'gĕl, **August Wilhelm von,** German critic, poet and translator: b. Hanover, 5 Sept. 1767; d. Bonn, 12 May 1845. At the University of Göttingen he received a thorough philological training under Heyne and became an admirer and friend of Bürger, with whom he was engaged in an ardent study of Dante, Petrarch and Shakespeare. From 1791 to 1795 he was tutor in a Dutch family at Amsterdam. Soon after his return to Germany he settled in Jena (1796), following an invitation of Schiller. His critical contributions to Schiller's *Horen* and to the *Jenaer Allgemeine Litteratur-Zeitung,* together with his translations from Dante and Shakespeare, established his literary reputation and gained for him a professorship at the University of Jena (1798). His house became the intellectual headquarters of the "romanticists," and was visited at various times between 1796 to 1801 by Fichte, Friedrich Schlegel, Schelling, Tieck, Novalis and others. From 1798 to 1800 he and his brother Friedrich edited the *Athenæum,* a periodical intended to express the "romantic" view of life and literature. In 1801 he went to Berlin, where he lectured before distinguished audiences on the æsthetic and philosophical creed of the romanticists. In 1804 he began to accompany Mme. de Staël, as tutor to her sons and adviser in her literary work, on her extended travels in Switzerland, France, Italy, England and Scandinavia. Mme. de Staël's book 'De l'Allemagne' shows distinct traces of his influence. In 1808 he was in Vienna and delivered his celebrated 'Vorlesungen über dramatische Kunst und Literatur' (pub. 1809–11). In 1813–17 he acted as secretary to the crown prince of Sweden, after which he joined again the household of Mme. de Staël until her death in 1817. In 1818 he became professor at the University of Bonn. He founded a special printing office for Sanskrit and edited several old Indian texts. As an Orientalist he was unable to adapt himself to the new methods opened by Bopp. As a critic he carried on the tradition of Lessing and Herder. Without possessing Lessing's power of style and personality he commanded a wider range of artistic susceptibility. His unerring linguistic and historical scholarship and the calm objectivity of his judgment enabled him to carry out, even more successfully than Herder himself, Herder's demand that literary criticism should be based on a sympathetic penetration into the specific individuality of each poetic production rather than on the application of preconceived æsthetic standards. He established models for the new method of analytical and interpretative criticism in his essays on Goethe's 'Hermann and Dorothea' and on Shakespeare's 'Romeo and Juliet.' His Vienna lectures 'On Dramatic Art and Literature' were translated into most of the languages of Europe and stand as a permanent contribution to critical literature; his definition of the terms "classic" and "romantic" met with general recognition; his views on the so-called "three unities" and on the "correctness" of Shakespeare evoked an especially strong echo in England and finally made the Johnsonian attitude toward Shakespeare appear obsolete.

Formal perfection of language is the chief merit of his poems, which suffer from a lack of originality. In his drama 'Ion' (1803) he vainly attempted to rival Goethe's 'Iphigenie.' He prided himself on being "model and master in the art of sonnets" among the Germans. He is at his best in sparkling literature parodies such as 'Ehrenpforte und Triumphbogen für Kotzebue' (1801).

His universal receptivity for poetical values, together with his rare facility of linguistic expression, predestined him to be a translator of the first order. His translations from Shakespeare were his greatest artistic contribution to German literature. It is due to him that Shakespeare is hardly less known in Germany than he is in England. Only 17 plays of the so-called Schlegel-Tieck Shakespeare were translated by Schlegel (1797–1810); the remainder were added, from 1825 to 1833, by Graf Wolf Baudissin and (very inadequately) by Dorothea Tieck, while Tieck himself acted only as a reviser and annotator. Schlegel also translated parts of Dante's 'Divina Commedia' (1791–97). His 'Blumensträusse, italiänischer, spanischer und portugiesischer Poesie' (1804) included Petrarca's sonnets. The two volumes of 'Spanisches Theater' (1803–09) introduced five plays of Calderon into German literature. His theoretical essays on the art of translating have guided several generations of German translators. His breadth of culture made him truly a "cosmopolitan of art and poetry." As a critic and as a translator he has lastingly contributed to the realization of Goethe's idea of a "Welt-Literatur."

His first wife, Caroline Michaelis (1763–1809), whom he married in 1796, was the widow of Dr. Böhmer. She was the most brilliant among the "romantic" women. She assisted Schlegel in some of his literary productions, and the publication of her correspondence in 1871 established for her a posthumous reputation as probably the greatest of German letter-writers. She separated from Schlegel in 1801 and became the wife of the young philosopher, Schelling, soon after.

Bibliography.— Schlegel's 'Sämtliche Werke' have been edited in 12 volumes by E. Böcking (1846); 'Vorlesungen über schöne Literatur und Kunst' (ed. by Minor, 3 vols., 1884); 'Œuvres écrites en français' (3 vols., 1846). Consult Strauss, D. Fr., 'Kleine Schriften' (1862); Haym, R., 'Die romantische Schule' (1870; new ed., 1914); Huch, Ricarda, 'Blütezeit der Romantik' (1899); 'Caroline, Briefe aus der Frühromantik' (ed. by Erich Schmidt, 2 vols., 1913); Sidgwick, Mrs. Alfred, 'Caroline Schlegel and her Friends' (1889); Bernays, M., 'Zur Entstehungsgeschichte des Schlegelschen Shakespeare' (1872); Genée, R., 'A. W. Schlegel und Shakespeare' (1903); Gundolf, F., 'Shakespeare und der deutsche Geist' (1911); Helmholtz, A. A., 'The Indebtedness of S. T. Coleridge to A. W. Schlegel' (1907).

TRAUGOTT BÖHME.

SCHLEGEL, Karl Wilhelm Friedrich von, German critic and philosophical writer, brother of A. W. Schlegel: b. Hanover, 10 March 1772; d. 11 Jan. 1829. As a student at Göttingen and Leipzig he was a voracious reader, especially of the classics. In his earliest publications, including the important essays 'Von den Schulen der griechischen Poesie' (1794); 'Über die Diotima' (1795); 'Über das Studium der griechischen Poesie' (1797), he appeared as a brilliant classical scholar and as an ardent worshipper of the objective harmony of "pure Hellenism." His unfinished 'Geschichte der Poesie der Griechen und Römer' (1798) had a lasting influence on the modern conception of the æsthetic values of Homer. But Schiller's distinction of two separate artistic types (the "naïve" and the "sentimental"), together with the consciousness of his own disharmonious self, caused him to discard his "graecomania." In Jena and in Berlin, where he alternately resided between 1796 and 1802, he was deeply influenced by Fichte, Schleiermacher and Schelling. During this period he wrote his essay 'On Goethe's Wilhelm Meister' (1798), his 'Gespräch über die Poesie' (1800) and a great mass of aphorisms, published as 'Fragmente' and 'Ideen.' Most of these works appeared in the *Athenæum,* which he conducted conjointly with his brother from 1798 to 1800. They are now generally recognized as the deepest and most significant expressions of the subjective idealism of the early romanticists. Most of their peculiar catchwords have been created by F. Schlegel. To him, religion is identical with "Bildung," with the free and endless cultivation of each man's individuality toward the "divine centre." "Romantic poetry" should be "progressive Universalpoesie"; it should give, in endless progression, intimations of the infinite through earthly symbols. "Romantic irony" is the necessary state of mind that enables us to recognize the appearances of life and poetry as mere "allegories" of infinite meanings. F. Schlegel was extremely fertile in discovering and illuminating new problems in the psychology of art, literature and ethics, so that he has been frequently called the forerunner of Nietzsche. But his mystical and paradoxical terminology made these "fragments" almost unintelligible to the general public, until Wilhelm Schlegel simplified and systematized his brother's ideas in his Berlin and Vienna lectures. Friedrich's eccentric novel, 'Lucinde' (1799), in which he extolled the union of sensual and spiritual love as an allegory of the divine cosmic Eros, caused a great scandal by its manifest autobiographical character, and contributed to the failure of his academic career in Jena. In 1802 he went to Paris, where he edited a monthly periodical, *Europa,* and began the study of Sanskrit. His book 'Über die Sprache und Weisheit der Indier' (1803) was the first scholarly treatment of its subject. After having embraced the Catholic faith he went to Vienna (1808), where he was employed in several official and diplomatic positions. Having gained the confidence of Metternich he secured the appointment as Austrian counsellor of legation at the Diet of Frankfort (1815). In 1818 he was again at Vienna. His later works, including 'Geschichte der alten und neueren Literatur' (1815), 'Philosophie des Lebens' (1828) and 'Philosophie der Geschichte' (1829) show an increasingly dogmatic standpoint in religious questions and reactionary tendencies in politics.

His wife, Dorothea (1763–1839), was the daughter of Moses Mendelssohn, the Jewish philosopher. In 1798 she left her first husband, the banker Veit, in order to become F. Schlegel's devoted "comrade" and literary helpmate. She published the products of her own pen, including the novel 'Florentin' (1801), under her husband's name; her adaptations of 'Merlin the Magician' (1804) and of 'Loher and Maller' (1805) have been included in Bohn's English edition of Schlegel's collected works. The 'Sämtliche Werke,' published in 15 volumes (1846), excluded the most important works of his pre-Parisian period. His 'Prosaische Jugendschriften,' on which his fame now rests almost entirely, were collected in two volumes by J. Minor (1882). Good selections ('Fragmente') were edited by E. von der Leyen (1904); 'Briefe an seinen Bruder Wilhelm,' ed. by Walzel (1890); Haym, R., 'Die romantische Schule' (1870; new ed., 1914); Wernaer, R. M., 'Romanticism' (1910); Joachimi, 'Die Weltanschauung der Romantik' (1905); Rouge, J., 'Frédéric Schlegel et la genèse du romantisme allemand' (1904); Enders, C., 'F. Schlegel' (1913).

TRAUGOTT BÖHME,
Professor of Greek and History.

SCHLEICHER, shlī'nĕr, **August,** German philologist: b. Meiningen, 19 Feb. 1821; d. Jena, 6 Dec. 1868. He devoted himself to the study of theology and Oriental languages, first at Leipzig and afterward at Tübingen. In 1846 he took the degree of doctor of philosophy at Bonn, and soon after qualified himself as a teacher of philology, to which he ever after devoted himself. In 1850 he was called to Prague as extraordinary professor of philology, a chair soon exchanged for that of comparative philology. At Prague he made himself more fully acquainted with the Slavonic languages and undertook a several months' journey to Lithuania in order to learn the Lithuanian language. In 1857 he accepted the appointment of honorary professor of the science of language and Old German philology in the University of Jena, where he continued until his death. He published a work on the comparative history of languages, 'Zur vergleichenden Sprachengeschichte' (1848), and another containing a systematic review of the European languages, 'Die Sprachen Europas' (1850). Later works are 'Die Formenlehre der kirchenslawonischen Sprache, erklärend und vergleichend dargestellt' (1853); 'Handbuch der litauischen Sprache' (1856–57). 'Zur Morphologie der Sprache'; 'Die deutsche Sprache' (1860); 'Kompendium der vergleichenden Grammatik der indogermanischen Sprachen'; 'Die Darwinische Theorie und die Sprachwissenschaft'; 'Ueber die Bedeutung der Sprache für die Naturgeschichte des Menschen' (1865).

SCHLEIDEN, shlī'dĕn, **Matthias Jakob,** German botanist: b. Hamburg, 5 April 1804; d. Frankfort, 23 June 1881. He was educated for the law in Heidelberg, but in 1833 took up the study of botany. He occupied the chair of botany at Jena from 1839 to 1863, when he was called to the Botanical Gardens at Dorpt. He was one of the first botanists to study plant

tissue, and his name is associated with that of Nageli, the Swiss botanist, in the early development of the cell theory. His works include 'Grundzüge der wissenschaftlichen Botanik' (1842–43; trans. into English as 'Principles of Scientific Botany,' 1849); 'Die Pflanze und ihr Leben' (1848); 'Baum und Wald' (1870); 'Die Rose' (1873).

SCHLEIERMACHER, shlī'ĕr-mäk'ĕr, **Friedrich Ernst Daniel,** German theologian and philosopher: b. Breslau, 21 Nov. 1768; d. Berlin, 12 Feb. 1834. He was educated by the Moravian Brethren at Niesky. In 1787 he began at Barby the study of theology, which he continued at Halle. In 1794 he was ordained and appointed assistant preacher at Landsberg on the Warthe. From 1796 to 1802 he was chaplain in the Charité-Haus at Berlin. During this period he translated some of Plato's Dialogues, contributed to the *Athenæum* conducted by the two Schlegels, and wrote the 'Discourses on Religion,' the 'Monologues' and 'Letters of a Minister out of Berlin.' In 1802 he published his first collection of sermons, which was followed by two others. In 1802 he removed to Stolpe, where he wrote his 'Critical View of Ethics.' In 1804 he was appointed extraordinary professor of theology at Halle. In 1807, when Halle was separated from Prussia, he went to Berlin and lectured there as well as preached. In 1809 he was appointed preacher at the Trinity Church in Berlin. With Fichte and W. von Humboldt he took a prominent part in the founding of the University of Berlin (1810) and remained, until his death, one of its most distinguished and successful professors. In 1811 he was elected a member of the Academy of Sciences and in 1814 secretary of the philosophical class. His liberal political activity and also his advocacy of doctrinal liberty as a basis of union between the Lutheran and Reformed churches procured him the disfavor of the Prussian government. As a preacher and writer he attracted a large and influential following, especially among the cultured classes, through the eloquent beauty of his style, through his broad interest in the intellectual and artistic movements of his time and through a rare combination of deep religious feeling with critical freedom toward traditional dogmas and conventional morality.

His 'Discourses on Religion, addressed to the educated among its despisers' (1799), show him under the influence both of Spinoza's pantheism and of Kant's criticism. Dissatisfied with the popular rationalistic theology of his times no less than with Kant's moralistic interpretation of religion, he assigns to religion a special province of the human soul, conceiving it to differ essentially from the intellectual and ethical sphere of our mind. Religion, therefore, is neither knowledge nor practice, but a state of feeling, an elevating tone of the whole mind. One of the main characteristics of religious experience is the feeling of being one with the All, the sentiment of an all-embracing and all-absorbing life. This "intuition (Anschauung) and feeling of the universe" does not imply any specific religious creed, not even the belief in a personal God or in the immortality of the soul. It merely establishes an emotional relation of oneness between the individual and the All; the finite self feels its absolute dependence upon the infinite. But this cosmic emotion constitutes, according to Schleiermacher, only one manifestation of religious sentiment; its equally important counterpart is the "self-intuition" and "self-determination" of a man's own "eternal self." Thus he reasserts the value of human personality, which had been somewhat neglected in Kant's system.

In his 'Monologues' (1800) he assimilates, from the monadology of Leibniz, the idea that each individual is an independent mirror of mankind as a whole and is destined to realize within itself the common ideal in an individual example. Each one should represent mankind in his own way, that is the first principle of morality. But the individual comes to life only in the whole. Thus Schleiermacher, contrary to Kant's ethical formalism, attaches great importance to the actual contents and results of morality, to existing institutions of culture and morality such as the family, society, church, state, arts, sciences, historical religions. The establishment of a higher order of things through the combined individual effort of human beings in human society becomes the central idea of his religious ethics. In his later writings, especially in his 'Christian Morality' and 'Christian Faith' the free philosophical religiousness of his 'Discourse' and 'Monologues' gave way to a more definite appreciation of the historical or "positive" religions and their consummation in Christianity. He finds in the person of its founder a living presentation of the endless process at the end of which appears the union of the divine and the human. By such interpretation he is enabled to adopt the Christian Church as a gradual realization in practice of the divine order of things, of the Civitas Dei. All positive affirmations with reference to the Deity he held to be figurative and anthropomorphic. In his 'Life of Jesus,' which anticipated that of D. F. Strauss in important respects, he appears as one of the first representatives of the critical school of Biblical research. His 'Dialektik' assumes the identity of thinking and being as the indispensable presupposition of all knowledge. His works on psychology, on æsthetics, on pedagogy have recently won renewed attention. Schleiermacher occupies a unique position as a representative alike of philosophy and theology. Practically all the modern endeavors to investigate the function of religion in the life of the human soul can be traced back to Schleiermacher. He is generally regarded as the greatest theologian of the Protestant Church since the time of the Reformation. His works have been published in three series entitled 'Theology' (11 vols.), 'Sermons' (10 vols.), 'Philosophical and miscellaneous writings' (9 vols.), Berlin 1836–65. Otto Braun edited an excellent critical selection from his works in four volumes (1910–13). The 'Discourses' and the 'Monologues' have been published in separate editions. Consult Dilthey, 'Leben Schleiermachers' (1870); 'Schleiermacher's Life, as unfolded in his Autobiography and Letters' (tr. by T. Rowan, London 1860, 2 vols.); Bender, W., 'Schleiermachers' Theologie' (2 vols., 1876–78); Lichtenberger, 'History of German Theology in the 19th Century' (1889); Pfleiderer, 'Protestant Theology in Germany since Kant' (1890); Troeltsch et al., 'Schleiermacher, der Philosoph des Glaubens' (1910); Cramaussel, 'La philosophie religieuse de Schleiermacher' (1908); Siegmund-Schultze, 'Schleiermacher's Psychologie' (1913).

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SCHLESINGER, slĕs'ĭn-jĕr, **Frank,** American astronomer: b. New York, 11 May 1871. He was graduated at the College of the City of New York in 1890 and took his Ph.D. at Columbia in 1898. He was an observer in charge of the International Latitude Observatory, Ukiah, Cal., in 1898, and in 1899–1903 he was astronomer at Yerkes Observatory. Since 1903 he has been the head of the Allegheny Observatory at the University of Pittsburgh. He is author of numerous papers on variations of latitude, spectroscopic binaries, stellar parallaxes and the reduction of astronomical photographic plates.

SCHLESWIG, shlāz'vĭg, Germany, a seaport in the province of Schleswig-Holstein, Prussia, at the head of the Schlei, 29 miles northwest of Kiel. It resembles a Dutch town in point of architecture and is divided into three parts — the Alstadt, or Old Town, the Lollfuss and the Friedrichsberg. The only square is the market-place in the Altstadt. The principal street, two miles long, is the Lollfuss. The buildings of importance are the three churches, of which the cathedral (12th century) is a fine Gothic pile, with a tower 368 feet high. Other buildings are the old castle, various benevolent institutions and the Convent for Noble Women. At the south are the remains of a wall erected by pagan kings against the invasion of Jutlanders. As early as the 9th century the city was a great mart for exchange of goods between the countries of the North Sea and those of the Baltic. The chief manufactures are woolen goods, laces, sugar, earthenware and leather. There are seven annual fairs. Pop. 19,905.

SCHLESWIG-HOLSTEIN, shlāz'vĭg-hōl'stīn, Germany, a maritime province of Prussia, between Denmark on the north; the Baltic, Lübeck and Mecklenburg on the east; Mecklenburg and the territory of Hamburg on the south; Hanover southwest and the North Sea on the west. It covers an area of 5,805 square miles. Schleswig is separated from Holstein by the Eider and the Schleswig-Holstein Canal. The province includes several islands in the Baltic and North seas and belongs to the great North German plain. Heligoland belongs to the province. The hilly district on the eastern coast contains the most productive land in the province; the central part is nearly barren, the western coast is protected by many dikes, and is fertile. The Baltic Coast, about 300 miles long, is hilly and contains numerous fjords which make excellent harbors. The North Sea Coast is low and flat. The Elbe forms the boundary on the south for 65 miles. The Eider is the principal river. Other rivers are the Trave and Stor. There are numerous lakes in the northeast, chief of which are Witten-See and Gotteslogs-See. The chief occupations of the inhabitants are agriculture and stock-raising. The majority of the occupants of Schleswig are Danish; of Holstein, German. The industrial works include sugar refineries, breweries and distilleries. The principal ports are Altona, Heligoland, Kiel, Flensburg, Neumühlen, Wyck and Tonning, and the capital, Schleswig. The province became a united duchy in 1386. By the Treaty of Prague, North Schleswig was to choose between Denmark and Prussia, but the privilege was ignored. Its history is a record of continuous strife between Danes and Germans, closing in favor of the latter. The united government of Holstein and Schleswig was first recognized by Margaret of Denmark in 1386, and the basis of this union was the Succession Act, and the practical contradiction between their feudal duty and their own inseparable connection gave rise to the celebrated "Schleswig-Holstein question," causing interminable separations and fusions. By the protocol of 1850 England, France, Austria, Russia, Sweden and Denmark settled, as far as diplomacy could, the much-discussed and difficult question of the duchies of Schleswig and Holstein in favor of Denmark. The unity of Denmark, Schleswig, Holstein and Lauenburg was secured by a uniform law of succession, and as far as was practicable their internal affairs were placed under a common administration. The protocol was succeeded by the treaty of 1852, which historians call "its logical consequence." This treaty assigned the succession to the kingdom of Denmark and the duchies to Prince Christian of Glücksburg, and declared the integrity of the whole Danish monarchy to be permanent; but the rights of the German Confederation with regard to Holstein and Schleswig were "reserved." The declaration was made in accordance with the views of France, Russia and England; the reservation was inserted in the interest of the German powers. It was under this protocol and its succeeding treaty that Denmark expected the aid of England when, in 1864, Austria joined with Prussia to overthrow the treaty and seize Schleswig-Holstein. England called a conference of the signatory powers and attempted by peaceful means to put an end to the war. To quote a modern historian in 'The Historians' History of the World,' "English diplomacy had made every effort imaginable to save the London Protocol and the integrity of the Danish State; but the sole price at which Napoleon III conjointly with England would venture on the strife, the conquest of the left bank of the Rhine, seemed too high, and so it satisfied itself with inviting the subscribers of the protocol to a conference in London. The latter met for no other purpose than the rupture of the protocol, from which the German powers also detached themselves, and to confirm the overthrow of the Danish State, which at the close of the diplomatic tournament saw itself thrown on its own resources. The first notable encounter between British and German warships after the opening of the World War occurred off Heligoland on 28 Aug. 1914.

The Treaty of Versailles of 1919 made provision for settling the ultimate fate of this province by plebiscite. For this purpose Schleswig was divided into two zones. The plebiscite was held in March 1920, when the vote in the northern zone was in favor of incorporation with Denmark, that in the southern was for remaining in Germany. The possession of Holstein, of course, was not in question. The result was a loss of 1,535 square miles of the province to Germany. Pop. of province and Heligoland, 1,462,187. See DENMARK.

SCHLEY, slī, **Winfield Scott,** American naval officer: b. near Frederick, Md., 9 Oct.

1839; d. New York, 3 Oct. 1911. He was graduated at the United States Naval Academy in 1860 and went as midshipman on the *Niagara* to China and Japan. Returning in 1861, he was made master, served on the *Winona* in the West Gulf blockading squadron, later on the *Monongahela* and the *Richmond,* and participated in all the engagements which led to the capture of Port Hudson in 1863, having been promoted to the rank of lieutenant in 1862. Ordered from Southern waters in 1864 to the Pacific squadron, he served on the *Wateree* as executive officer till 1866, when he was promoted lieutenant-commander. In this period he suppressed an insurrection of Chinese coolies on the Chincha Islands, and for protection of United States interests landed a body of men at San Salvador during a revolution. From 1866 to 1869 he was instructor at the Naval Academy; then, being assigned to the Asiatic station, served there on the *Benicia* for three years, earning distinction at the taking of the Korean forts on the Salee River in 1871. Again, in 1872, he was detailed as instructor at the Naval Academy, and in 1874 was made commander. After serving in Europe and on the west coast of Africa, he commanded the *Essex,* on the Brazil station, 1876–79. He was selected to command the third government relief expedition (1884) for the rescue of Lieut. A. W. Greely (q.v.), which he promptly accomplished. Having served (1885–89) as chief of the Bureau of Recruiting and Equipment, he was promoted captain in 1888. From 1889 to 1891 he was in the southern Pacific as commander of the cruiser *Baltimore,* and in the latter year interposed at Valparaiso, Chile, when American sailors were assaulted in the streets.

In 1895 he was placed in command of the *New York;* was chairman of the Lighthouse Board 1897–98; in February of the last-named year became commodore, and after the outbreak of the war with Spain was given command of the Flying Squadron. Sailing from Hampton Roads, 13 May 1898, he began the historic search for Cervera's Spanish fleet, discovered it and finally established a blockade of the harbor at Santiago de Cuba (see UNITED STATES — WAR WITH SPAIN), where, on 29 May, Cervera was found to be. Schley's squadron was united 1 June with the fleet under acting Rear-Admiral W. T. Sampson (q.v.) and the blockade was continued until 3 July, when the Spanish ships came out of the harbor and were destroyed by the American vessels, which, during the temporary absence of Sampson, were under the immediate command of Commodore Schley, on board the *Brooklyn.* In August 1898 Schley was raised to the rank of rear-admiral.

An unfortunate controversy arose between partisans of Schley and those of Sampson over their respective claims to the credit of this great victory. Of that discussion neither officer personally took public notice until after the appearance of a work by Edgar Stanton Maclay (q.v.), entitled 'History of the United States Navy,' in which the author referred to Commodore Schley as a "caitiff, poltroon and coward." The proofs of the book had been read and approved by various naval officers, among them Rear-Admiral Sampson; and on 22 July 1901 Schley applied to the Secretary of the Navy for a court of inquiry. This request was granted 24 July. The court was convened 12 September and its sessions continued for one month. It consisted of Admiral Dewey, president, and Rear-Admirals Benham and Ramsey. The verdict, returned 14 Dec. 1901, was a disagreement, Admiral Dewey refusing to subscribe to censures on Schley's conduct which were made by the two other members. The "majority" report, signed by two members only, found Schley guilty of vacillation, lack of enterprise and disobedience, and in other particulars strongly criticised his conduct, both before and during the battle of Santiago de Cuba, while recognizing his personal courage in the action. Admiral Dewey, however, presented a "minority" report, in which he praised Schley for promptness and efficient service, and gave him the credit for the destruction of Cervera's fleet. Schley filed with the Secretary of the Navy objections to the "majority" report, but it was nevertheless approved by Secretary Long, 20 Dec. 1901. In January 1902, Rear-Admiral Schley appealed from the verdict to the President, who, however, confirmed Secretary Long's approval. On recommendation of the court, no action was taken upon its findings. Schley's retirement from active service at the age limit occurred 9 Oct. 1901. In collaboration with J. R. Soley (q.v.), he wrote 'The Rescue of Greely' (1886); he also wrote 'Forty-five Years under the Flag' (1904).

SCHLICH, shlĭk, SIR **William,** English forester: b. Darmstadt, 1840. He was educated at Darmstadt and the University of Giessen and was appointed in 1866 to the Indian forest department. He held the offices of conservator of forests, 1871, and inspector-general of forests, 1881; and organized the first school of forestry in England, at Cooper's Hill, in 1885. He was made F.R.S. in 1901 and knighted in 1909. He is the author of 'A Manual of Forestry' (5 vols., 1889–96); 'The Outlook of the World's Timber Supply'; 'Afforestation in Great Britain and Ireland'; 'Forestry in the United Kingdom.'

SCHLIEMANN, shlē'măn, **Heinrich,** German archæologist: b. Neubuckow (Mecklenburg-Schwerin), 6 Jan. 1822; d. Naples, 27 Dec. 1890. He spent five years as a pupil in retail business in Fürstenberg, then embarked as cabin-boy on board a ship bound for Venezuela. The ship was wrecked on the coast of Texel, but Schliemann was saved and taken to Amsterdam. Here he obtained a post in a commercial house and set himself to acquire a thorough knowledge of the chief European languages. In 1846 he was sent to Saint Petersburg as agent for another Amsterdam firm. In 1850 he happened to be in California on 4 July when the State entered the Union and acquired American citizenship. By 1856 he had learned modern Greek and begun the study of ancient Greek, and in 1858–59 traveled in Sweden, Denmark, Germany, Italy, Egypt, Syria and Greece. Having amassed a considerable fortune in trade, he retired from it in 1864 in order to devote himself wholly to archæological studies. He traveled round the world in 1864–66, and in 1868 went to the coast of Asia Minor by way of Corfu and the Morea. In 1870 he undertook at his own cost the excavation of the heaps of ruins at Hessarlik, in the Troad, which he believed to be the site of ancient Troy (q.v.). These excavations he carried on with interruptions until 1890. Contrary to agreement with the Porte, he retained possession of all the spoils discovered there, and was compelled by the Greek courts to pay the sum of $10,000. He presented his collections to the Museum für Völkerkunde at Berlin. In 1876 he began similar excavations at the site of ancient Mycenæ in Greece. Little confidence was at first placed in his methods by trained archæologists, and when his discoveries had been made their historical value was for a time doubted. But scholars now generally agree that they attest powers adequate to the Trojan War, and make the traditional account probable in its main outlines. Consult his autobiography edited by his wife (Leipzig 1891); Schuchardt, 'Schliemann's Excavations and Archæological and Historical Studies' (London 1891); Sandys, J. E., 'A History of Classical Scholarship' (Cambridge 1908); Hawes, C. H. and H., 'Crete: the Forerunner of Greece' (London 1909).

SCHLOSSER, shlŏs'sĕr, **Friedrich Christoph,** German historian: b. Jever, Oldenburg, 18 Nov. 1776; d. Heidelberg, 23 Sept. 1861. He studied at the University of Göttingen 1794–98, and published his first history, 'Geschichte der bildersturmenden Kaiser des Öström' in 1812. He was professor in the Lyceum of Frankfort 1812–14 and city librarian until 1819, when he was called to Heidelberg as professor of history at the university, a position retained until his death. Schlosser's writings, which are characterized by a great love of truth and a high moral tone in judgment, include 'Weltgeschichte in zusammenhängender Erzählung' (1817–24); 'Geschichte des 18. Jahrhunderts' (1823); 'Universal-historische Uebersicht der Geschichte der alten Welt und ihre Kultur' (1824–34).

SCHLUNDT, shlŭnt, **Herman,** American chemist: b. Two Rivers, Wis., 16 July 1869. He was graduated at the University of Wisconsin in 1894 and took his Ph.D. at the University of Leipzig in 1901. He was for a time connected with the faculty at the University of Wisconsin, and from 1902 was associated with that of the University of Missouri, where he was professor of physical chemistry in 1907–13, and chairman of the department of chemistry in 1910–15. He is author of numerous articles on physical chemistry and radio-activity and of 'Laboratory Experiments in General Chemistry' (1912).

SCHLUTER, shloo'tĕr, **Andreas,** German sculptor and architect: b. Hamburg, 20 May 1664; d. Saint Petersburg, 1714. His father was a sculptor and brought him in early life to Dantzic. He left that place for Marschau, where he opened a studio as a sculptor and eventually (1694) settled in Berlin. The Baroco style of architecture, then popular in Holland, attracted his fancy and in this style he began (1696) to make designs for rebuilding the royal residences. Before carrying them out he took a journey through Italy, where he built the central front of the castle at Charlottenburg, and subsequently began the restoration of the royal castle at Berlin and became actively engaged in designing buildings of this class in other parts of the country. He eventually removed to Saint Petersburg and became court architect to Frederick the Great. Among the statues he erected in Berlin are the statue of the grand elector (cast by Jacobi in 1700). Besides the bronze statue of the Grand Elector Frederick III at Königsberg, the tomb of Frederick I and his wife in Berlin and the marble screen in the church of Saint Mary, he produced numerous designs for the gorgeous interior decoration of the Goldsmiths' Hall, Berlin, and other buildings. Consult Adler, 'Andreas Schlüters Leben.'

SCHMALKALDEN, shmäl'käl"dĕn, **Articles of,** a Protestant confession which was drawn up at the instance of John Frederick, Elector of Saxony, by Luther and other divines, and signed at Schmalkalden in February 1537. These articles were essentially the same as those of the Confession of Augsburg, but in much stronger language. See REFORMATION, THE.

SCHMALKALDIC LEAGUE, the league formed at the close of 1530 by the Protestant princes of Germany, assembled at Schmalkalden, to resist the aggressive measures contemplated by the Emperor Charles V. It ultimately included the whole of northern Germany, Saxony, Würtemberg and Denmark, with portions of Bavaria and Switzerland. The object of the league was the common defense of the political and religious freedom of the Protestants, and the confederacy was first intended to continue only for six years, but subsequent events induced them in 1535 to renew it for another period of 10 years, and to raise a permanent army to carry out the objects of the league. About this time it was joined, among others, by the king of France, Francis I, though only from political motives, and Henry VIII of England declared himself its protector. The confederacy received a fuller consolidation by a new Protestant confession, drawn up at the instance of John Frederick of Saxony by Luther and other divines, and known as the Articles of Schmalkalden, from the circumstance of their having been signed (1537), like the league itself, at the town of Schmalkalden. These articles were essentially the same as those of the Confession of Augsburg. The league was latterly crippled by mutual jealousy and the conflict of interests, and its early successes in the so-called Schmalkalden War were ultimately more than outweighed by the complete rout at Mühlberg and the capture of John Frederick. The ends of the league, however, were ultimately gained through the instrumentality of Duke Maurice, now Elector of Saxony, who in 1552 declared war against the emperor, and forced him in 1552 to grant the Treaty of Passau, which secured the religious liberty of the Protestants. See also CHARLES V; REFORMATION, THE.

SCHMAUK, småk, **Theodore Emanuel,** American Lutheran clergyman: b. Lancaster, Pa., 1860. He was graduated at the University of Pennsylvania in 1880, ordained to the Evangelical Southern ministry in 1883; was editor-in-chief of the *Lutheran Church Review* from 1895; literary editor of the *Lutheran* from 1889; professor of Christian faith in the Lutheran Theological Seminary from 1911 and president of the General Council of Evangelical Lutheran Churches in North America from 1903. He published 'The Negative Criticism of the Old Testament' (1894); 'History of Old Salem and Lebanon' (1898); 'The Early

Churches of the Lebanon Valley' (1902); 'The History of the Lutheran Church' (1903); 'The Christian Kindergarten' (1906); 'The Confessions and Confessional Principle of the Lutheran Church' (1909); 'Christianity and Christian Union' (1913), etc.

SCHMID, shmĭt, **Matthias**, Austrian painter: b. See, Tyrol, 14 Nov. 1835. He studied at the Munich Academy (1856) under Schrandolph, and was a pupil of Piloty (1869), when the persecution to which the clergy subjected him on account of his liberal views caused him to leave Tyrol. He won the Vienna medal in 1873. Among his canvases are 'The Entombment'; 'The Flight into Egypt'; 'The Judge of Morals' (1873); 'Festival of the Parson's Cook' (1874); 'The Betrothal' (1879); 'Repairing the Damage' (1882); 'Blind Man's Buff' (1884); 'Forsaken' (1885); 'In the Picture Gallery' (1886). He has also done in fresco at the Innsbruck Cemetery 'The Three Marys at Christ's Tomb' (1859).

SCHMID, Ulrich, German historian: b. Niederrieden, Swabia, 4 July 1876. He was educated at the Memmingen Latin School and the Würzburg Gymnasium, the universities of Würzburg, Freiburg-in-Breisgau, Munich and Vienna. He has devoted much of his time to the study of the history of culture and since 1904 has edited *Walhalla* at Munich. He has published 'Saint Ulrich, Bischof von Augsburg' (1901); 'Traditionen an die Kirche Saint Veit am Gölsen' (1904); 'Kirchen- und profanhistorische Mitteilungen aus italienischen Archrien und Bibliotheken' (1905); 'Das deutsche Volkslied' (1905); 'Johann Geyler a Kaisersberg' (1906); 'Das Chorgestühl in der Saint Martinskirche zu Memmingen' (1906); 'Agnes die Bernauerin und Herzog Albrecht III der Gütige' (1906); 'Die Schlacht bei Hoflach-Alling und ihr Denkmal' (1906); 'Tagebuch des Pfarrers Michael Gotzmann' (1907); 'Otto von Lonsdorf, seine Herkunft und Reformen im Passauer Hochstift' (1909); 'Karl Haider, ein deutscher maler' (1910); 'Albin Egger-Lienz' (1910); 'Reisebilder Bamberg-Würzburg' (1910); 'Italienische Reisebilder' (1911); 'Das katholische Kirchenjahr in Wort and Bild' (1912). He edited 'Das katholische Kirchenjahr in Bildern' (1910), and the religious art series of *Glaube und Kunst* since 1912.

SCHMIDT, shmĭt, **Johannes**, German philologist: b. Prenzlau, 29 July 1843; d. Berlin, 4 July 1901. After study at the University of Bonn he was there made professor (1873), in the same year removed to Grätz, and from 1876 until his death was at Berlin. In 1884 he was elected to the Prussian Academy of Sciences. Probably he was not excelled by any scholar of his time in an extensive scientific knowledge of the grammar of the Indo-European group of languages. From 1875 he edited (with Kuhn) the 'Zeitschrift für vergleichende Sprachforschung'. Among his more important works are 'Zur Geschichte des indogermanischen Vokalismus' (1871–75); 'Die Verwandschaftsverhältnisse der indogermanischen Sprachen' (1872); 'Die Pluralbildungen der indogermanischen Neutra' (1889), and 'Kritik der Sonantentheorie' (1895).

SCHMIDT, Johann Kaspar, German philosopher (1806–56), better known under his pseudonym of MAX STIRNER (q.v.).

SCHMIDT, Nathaniel, American Orientalist: b. Hudiksvall, Sweden, 22 May 1862. He was educated at the universities of Stockholm, Colgate and Berlin. He became professor of Semitic languages and literature at Colgate University in 1888 and since 1896 holds the same chair in Cornell University. In 1904–05 he was director of the American School for Oriental Study and Research in Jerusalem. He was president of the Society for Biblical Literature and Exegesis in 1914. Among his publications are 'Introduction to the Hexateuch' (1896); 'Biblical Criticism and Theological Belief' (1897); 'The Republic of Man' (1899); outline histories of Egypt, India, Babylonia and Assyria, Syria and Arabia (1901–04); 'The Prophet of Nazareth' (2d ed., 1907); 'The Original Language of the Parables of Enoch' (1908); 'The Messages of the Poets' (1911). He has written a number of articles on the books of the Old Testament for THE ENCYCLOPEDIA AMERICANA, and has also contributed largely to other encyclopedias and to theological publications.

SCHMITZ, Eugene F., American politician: b. San Francisco, 19th century. He was elected mayor of San Francisco on the Union Labor ticket in 1900 and was twice re-elected. In 1907 he, with Abe Ruef (q.v.), was tried on a charge of extortion in connection with the sensational graft scandals then uncovered. He was convicted, but succeeded in having the judgment set aside. Later he again became active politically and he was his party's candidate for mayor in 1915, but was not elected.

SCHMUCKER, shmŭk'ĕr, or **SMUCKER, Samuel Mosheim**, American historical writer: b. New Market, Va., 12 Jan. 1813; d. Philadelphia, Pa., 12 May 1863. He was graduated at Washington College, Pennsylvania, in 1840, and was licensed to preach in the Lutheran Church. In 1848 he resigned his duties as a pastor to study law, was admitted to the bar and practised for a time in Philadelphia; but after 1855 devoted himself almost wholly to literature. Author of 'Errors of Modern Infidelity' (1848); 'Court and Reign of Catherine II, Empress of Russia' (1855); 'Life of John C. Fremont' (1856); 'Life of Alexander Hamilton' (1856); 'Life of Thomas Jefferson' (1857); 'Arctic Explorations and Discoveries' (1857); 'Life of Dr. Elisha Kane and Other American Discoverers' (1858); 'History of Modern Jews' (1860); 'Life of Daniel Webster' (1859), etc. At his death he had completed one volume of his 'History of the Civil War in the United States' (1863).

SCHMUCKER, Samuel Simon, American Lutheran clergyman and educator: b. Hagerstown, Md., 28 Feb. 1799; d. Gettysburg, Pa., 26 July 1873. He was educated at the University of Pennsylvania and at Princeton Seminary and was ordained in the Lutheran Church in 1821. He served as pastor in 1821–26 and 1826–64 he was chairman of the faculty of the Theological Seminary at Gettysburg, Pa. He was instrumental in securing a connection between the Lutheran churches in America and Europe. He was a voluminous writer. Author of 'Elements of Popular Theology' (1834); 'Fraternal Appeal to the American Churches on Christian Union' (1838); 'Lutheran Manual' (1855); 'Evangelical Lutheran Catechism' (1859); 'Unity of Christ's Church' (1870), etc.

SCHNEIDER, shnī'dĕr, **Charles Conrad**, American engineer: b. Apolda, Saxony, 24 April 1843; d. 8 Jan. 1916. He was graduated at the Royal Technical School, Chemnitz, Germany, in 1864, came to the United States in 1897 and engaged in locomotive and bridge construction. He was vice-president of the American Bridge Company in 1900–03 and in 1911 became a member of the board of engineers for the Quebec bridge. Among the many bridges he designed and built are the cantilever Fraser River bridge on the Canadian Pacific Railway, and the Niagara cantilever bridge. In 1905 he was president of the American Society of Civil Engineers. Author of 'General Specifications for Railroad Bridges' (1886); 'General Specifications for Highway Bridges' (1901); 'General Specifications for Structural Steel Work in Buildings' (1905; new ed., 1910).

SCHNEIDER PROCESS OF ARMOR PLATE. See ARMOR PLATE.

SCHNITZER, shnĭt'sĕr, **Edward.** See EMIN PASHA.

SCHNITZLER, Arthur, Austrian dramatist and novelist: b. Vienna, 15 May 1862 (the son of the well-known laryngologist, Professor Johann Schnitzler, 1835–93); still living at Vienna. He studied medicine at the University of Vienna, receiving his degree in 1885, was interne in the Vienna General Hospital from 1886 to 1888, and then became an assistant at the Vienna Polyclinic as well as a private general practitioner. In judging the general tone, style and choice of subject of the Viennese writers of Schnitzler's generation it is important to remember that they differ from their Berlin contemporaries in that the former are more affiliated, in the emulation of their models, with French and Italian writers, while the latter incline more to an imitation of the Russians and Scandinavians. This means greater perfection of form and style among the Viennese, greater depth of treatment and recognition of the social milieu among the Berliners. Schnitzler and Gerhart Hauptmann may well be regarded as typical representatives of their respective cities in the same generation. 'Anatol' (Berlin 1892), Schnitzler's first publication, is typical of almost all his later work. It is a series of seven dramatic scenes, each depicting, in delicate psychological treatment, a different phase in the rather frivolous love-life of the hero. 'Liebelei' (1896) is a drama depicting love in a more tragic aspect. 'Der grüne Kakadu' (1899), was played by Mrs. Fiske in New York as 'The Green Cockatoo,' as a «curtain-raiser» to Hauptmann's 'Hannele'; it is a one-act play of powerful dramatic construction, dealing with a superficial episode of the French Revolution. His later plays become more mystical and resigned in tendency, although the erotic undercurrent is absent only in one play ('Professor Bernhardi,' see below): 'Paracelsus' (1899), 'Der Schleier der Beatrice' (1901), 'Lebendige Stunden' (1902), 'Der einsame Weg' (1903), 'Der Ruf des Lebens' (1905), 'Comtesse Mizzi' (1909), 'Der junge Medardus' (1910), 'Das weite Land' (1911). 'Professor Bernhardi' (1913) is a serious comedy, a satirical presentation of Austrian political intrigue, in which great issues are made to depend on trifling happenings. Only one female character appears in the play, a hospital nurse, who drops from view as soon as she has started the mischief. The treatment of anti-Semitic tendencies in ousting a Jewish hospital-director from his position because he has come into conflict with the interests of the ruling church receives added interest from the fact that Schnitzler is himself by birth a Jew and by training a physician, and it is not unlikely that the subject may be taken from one of his own experiences. In 1915 Schnitzler published 'Komödie der Worte,' three one-act plays, in which he shows, by again resorting to erotic subjects, that the war in Europe has not always been successful in turning men's minds to serious topics. In one of the plays ('Die Stunde des Erkennens') a physician who has been married for 22 years orders his wife to leave the house for a marital infidelity committed 10 years before. This is a theme occurring again and again, especially in his short stories, which must not be overlooked, as their artistic value is perhaps even higher than that of his plays. Among the best short stories are 'Sterben' (1895), 'Die Frau des Weisen' (1898), 'Leutnant Gustl' (1901), 'Die griechische Tänzerin' (1904), 'Der Tod des Junggesellen.' There are also two longer narratives (the second a long novel): 'Frau Bertha Garlan' (1901), 'Der Weg ins Freie' (1908). Schnitzler's collected dramas have appeared at Berlin (1910, 4 vols.), as well as the collected narratives (1910, 3 vols.). (See ANATOL). A translation of the one-act play 'Literature' will be found in 'The German Classics of the 19th and 20th Centuries' (New York 1914), and a number of other plays have been translated by Edwin Björkman. Consult Hartmann, J. W., «Schnitzler's Vienna» (*The New Review*, New York, January 1916); Pollard, Percival, 'Masks and Minstrels of New Germany' (Boston 1911); Salkind, Alexander, 'Arthur Schnitzler' (Leipzig 1907); Ratislaw, J. K., 'Arthur Schnitzler' (Hamburg 1911); Kapp, Julius, 'Arthur Schnitzler' (Leipzig 1912).

JACOB WITTMER HARTMANN,
The College of the City of New York.

SCHNORR VON KAROLSFELD, shnōr fŏn kär-ōls-fĕlt, **Julius**, German painter: b. Leipzig, 26 March 1794; d. Dresden, 24 May 1872. His father was a painter and initiated him into the rudiments of art. In 1811 he proceeded to Vienna, and while there produced several works. In 1817 he visited Italy, spent a year at Florence and then took up his residence at Rome. Here he attached himself to the «Nazarenes,» then under the leadership of Cornelius and Overbeck. His painting 'The Wedding in Cana' attracted so much notice that he was chosen, along with the two painters already named, to paint the walls of the Villa Massimi at Rome. Among other works produced by him at Rome are 'Jacob and Rachel'; 'Ruth and Boaz'; 'The Flight into Egypt,' and 'Children brought to Jesus.' He removed to Munich in 1827, and was appointed professor of historical painting in the Academy of

Fine Arts there. He was next commissioned to decorate the new palace with frescoes of scenes from the national poem of the 'Nibelungenlied'; and adorn the Festsaalbau with incidents in the lives of Charlemagne, Frederick Barbarossa and Rudolf of Hapsburg. These are perhaps the most popular of modern works in fresco in Munich. In 1846 he became director of the picture gallery and professor at the Academy of Fine Arts in Dresden. While here he completed his illustrations of the Bible, 'Die Bibel in Bildern' (1852–60). They exhibit wonderful animation, variety and power. To the Dresden period also belong the oil-painting of 'Luther at the Diet of Worms,' and the designs for a window for Saint Paul's, London, representing scenes from the life of Saint Paul.

SCHODDE, George Henry, American scholar: b. Allegheny, Pa., 15 April 1854; d. 15 Sept. 1917. He was graduated from Capital University 1872 and from Leipzig University 1877, was professor of Greek and theology at Capital University, Columbus, Ohio, from 1880, editor of *The Lutheran Standard* from 1880 and of *The Theological Magazine* from 1897. He was also a contributor to the *Independent*, the *Sunday School Times* and a large list of church periodicals. He published 'The Protestant Church in Germany' (1903); and translated 'The Book of Enoch' and 'The Book of Jubilees,' from the Ethiopic, and 'Day in Capernaum' from the German of Delitzsch, Weiss' 'Religion of the New Testament' (1905). Weiss' 'Commentary on the New Testament' (4 vols. 1906), etc.

SCHOEBORN, shē'bôrn, **August,** American architect: b. Germany, about 1827; d. Washington, D. C., 25 Jan. 1902. He came to Wisconsin in 1849, but later removed to Washington, D. C., where until his death he was a member of the staff of the architect of the Capitol. In Civil War time he drafted plans of barracks, hospitals and forts for the quartermaster-general's department, and maps and plans for the use of General McDowell.

SCHOEFFER, shĕf'fĕr, **Peter,** German printer: b. Gernsheim, near Mainz, about 1430; d. about 1502. At about the age of 20 he was a student at the University of Paris, and a copyist. It seems likely that Gutenberg taught him what he knew of printing and employed him in his establishment at Mainz. After Fust and Gutenberg dissolved partnership Schoeffer was connected with the former, and the two names are associated on the imprint of the 'Book of Psalms,' printed in 1457. The reputation of his being the inventor of matrices and the typemold got abroad during his lifetime and was aided by his own artful insinuations; but modern research has disproved his claim to the work done by Gutenberg. He followed the career of printer after the death of his partner, Fust, and issued many works alone. He was succeeded by three sons who became eminent printers. Consult De Vinne, 'The Invention of Printing' (1876).

SCHOENECK, shēn'ĕk, **Edward,** American lawyer: b. Syracuse, N. Y., 1 Aug. 1875. He studied law at Syracuse University and was admitted to the bar in 1903. In 1902 he became a member of the board of supervisors of Onondaga County, was a member of the New York assembly, 1904–07 and mayor of Syracuse, 1910–13. He was elected lieutenant-governor of New York State 1915–16.

SCHOENFELD, shēn'fĕlt, **Hermann,** professor and author: b. Oppeln, Germany, 21 Jan. 1861. He was educated in the universities of Berlin, Breslau and Leipzig, and in 1888 accepted a call as instructor in modern languages at Providence, R. I., and later at New Bedford, Mass. In 1891 he was appointed to Johns Hopkins University; in 1893 sent by President Cleveland as consul at Riga, Russia, and delegated by the United States Bureau of Education to investigate higher education in Russian, Austrian and Prussian Poland. Since October 1894 he has been professor of Germanics at Columbian (now George Washington) University. Dr. Schoenfeld is a contributor to many German and American magazines and encyclopedias, including THE ENCYCLOPEDIA AMERICANA. He has published 'Brant and Erasmus' (1892); 'Erasmus and Rabelias' (1893); 'Higher Education in Poland' (1896); 'German Historical Prose' (1896); Leopold von Ranke' (1899); 'Treitschke'; he edited Schiller's 'Maria Stuart' (1899) and 'Wilhelm Tell' (1902); Bismarck's 'Orations and Letters' (1905); 'History of Teutonic Women, and Slavic Women' (1906); 'Essays on Universal Peace and German Armaments' (1913); 'Causes of the European Conflagration' (1914–15). Since 1914 he has also contributed extensively to journalistic literature on contemporaneous European history, especially of the Slavs and the Near East.

SCHOENLEBER, shēn'lā-bĕr, **Gustav,** German painter: b. Bietigheim, Würtemberg, 3 Dec. 1851. He studied under Kurtz in Stuttgart and Adolf Lier in Munich, and traveled in Italy and Holland, in the latter country especially finding congenial themes for his landscape art. He reproduced the tender tints of the flat, moist land with now and then a church steeple or a clump of trees as a diversifying feature. In 1880 he was made professor at Carlsruhe. Among his works are 'Harbor of Genoa' at Rotterdam; 'Venetian Fishing Boats' at Hamburg Gallery; 'View of Flushing at Low Tide' (1881), Dresden Museum; 'Evening near Dordrecht,' Stuttgart Museum.

SCHOENN, shēn, **Aloys,** Austrian artist: b. Vienna, 11 March 1826; d. Krumpendorf, 16 Sept. 1897. He studied at the Vienna Academy under Führich and Leander Russ. He served through the Italian campaign of 1848 and fought in the Hungarian war. During 1850–51 he studied at Paris, and then traveled in the East. His field is genre. Some of his works are 'Evening on the Nile'; 'Departure of Tyrolese Students from Vienna in 1848'; 'Storming of Ladrone,' 'On the Coast of Genoa,' 'Goose Market at Cracow,' at Vienna; 'Scene in Persecution of Jews'; 'Festival in Capri'; 'Fish Market at Chioggia'; 'Market in Bosnia'; 'Market in Tunis.'

SCHOFIELD, skō'fēld, **John McAllister,** American military officer: b. Gerry, N. Y., 29 Sept. 1831; d. Saint Augustine, Fla., 4 March 1906. He was graduated from West Point in 1853, and assigned to garrison duty in South Carolina and Florida. In 1855–60 he was assistant professor of philosophy at West Point, and was professor of physics in Washington University, Saint Louis, Mo., in 1860–61. He acted as mustering officer for the State of Missouri at the outbreak of the Civil War, served on the staff of General Lyon in the Missouri campaign and in November 1861 was appointed brigadier-general of volunteers. He was in command of the District of Missouri in 1861–62, of a division in the Army of the Cumberland in 1863, and again commanded the Department of Missouri in 1863–64. In 1864–65 he commanded the Department of the Ohio, was engaged in the Atlanta campaign and commanded at the battle of Franklin, Tenn., in 1864, receiving rank as brigadier-general and brevet major-general in the regular army in recognition of his services. He continued in the army after the war, was Secretary of War in 1868–69, and commanded various departments until 1888 when he was assigned to the command of the army of the United States as senior major-general. In 1895 he was promoted lieutenant-general, a grade created for him, and later in the same year he was retired. He published 'Forty-six Years in the Army' (1897).

SCHOFIELD, Walter Elmer, American artist: b. Philadelphia, Pa., 9 Sept. 1867. He studied at the Academy of Fine Arts, Philadelphia, and in Paris under Bougereau, Aman Edmond Jean, Ferrier and Doucet. During a three years' residence at Saint Ives he specialized independently in landscape work and notable examples are 'Morning' and 'Midwinter Thaw' in the Cincinnati Museum, 'Across the River' in the Carnegie Institute, Pittsburgh, 'Morning after Snow' in the Corcoran Art Gallery, Washington, and 'Sand Dunes near Lelant' in the Metropolitan Museum, New York. He received several medals and honor awards and was elected National Academician in 1907. In 1915 he enlisted in the British army; received advancement to captain of artillery and saw active service in France.

SCHOFIELD, William Henry, American educator: b. Brockville, Ontario, 6 April 1870. He was graduated at the University of Toronto in 1889, and took his Ph.D. at Harvard in 1895, studying at Paris, Christiania and Copenhagen in 1895–97. He was master of modern languages at Collegiate Institute, Hamilton, Ontario, in 1889–92. From 1897 he was connected with the faculty at Harvard, and from 1906 he was professor and head of the department of comparative literature there. He was Harvard exchange professor at Berlin in 1907–08; and was lecturer at the Sorbonne, Paris, and at the University of Copenhagen in 1911. He was editor-in-chief of 'Harvard Studies in Comparative Literature.' Author of 'Studies on the Libeaus Desconus' (1895); 'The Home of Eddic Poems' (1899); 'English Literature from the Norman Conquest to Chaucer' (1905); 'Chivalry in English Literature' (1912); 'A Blind Bard from Faery' (1918) 'Life of William Wallace' (1918), etc.

SCHOHARIE, N. Y., town and village, county-seat of Schoharie County, on Schoharie Creek, and on the Middleburg and Schoharie and the Schoharie Valley railroads, about 28 miles west of Albany and 20 miles southwest of Schenectady. It is in an agricultural region, and in the vicinity are valuable stone quarries. It has a high school, graded elementary schools and a school library. Pop. town, 2,526; village, 996.

SCHOHARIE GRIT, a more or less siliceous and calcareous shale, or a silicious limestone typically found in the Schoharie Valley of eastern New York, from which it takes its name. It is intimately associated with the overlying Onondaga limestone of New York, with which together it forms the Ulsterian subgroup of the Mid-Devonic group. At its type location it is not over six feet thick and richly fossiliferous. In the Hudson Valley it is a shale, almost barren and sometimes 100 feet or more in thickness. See DEVONIAN; OLD RED SANDSTONE.

SCHOLAR-GIPSY, The, and THYRSIS. Matthew Arnold's pastoral idyls, 'The Scholar-Gipsy' (1853) and 'Thyrsis' (1866) are linked by internal references and, like 'L'Allegro' and 'Il Penseroso' by similarities of form, mood, scene and theme, both being interpretations of the sentiment of the Cumner country near Oxford as felt by a poetic spirit somewhat ill at ease amid the distractions of his century. The earlier poem was suggested by an incident related in Glanvil's 'Vanity of Dogmatizing' (1661) of an Oxford lad who had joined a band of gypsies and had acquired from them a secret for working wonders through the power of imagination. Arnold makes this lad a symbol of the simple-hearted idealism of an elder day, and feigns that his shy spirit still haunts the Cumner hills and appears to shepherds and reapers and village maidens dancing around the Fyfield elm in May — his hands filled with «dark bluebells drench'd with dews of summer eves.» Apostrophizing this charming genius loci, the poet bids him shun the feverish contact of men infected with «this strange disease of modern life, with its sick hurry, its divided aims, its heads o'ertax'd, its palsied hearts.» 'Thyrsis,' the only rival in English to 'Lycidas' and 'Adonais,' was written ostensibly to commemorate the author's friend, Arthur Hugh Clough, who had died at Florence in 1861; but there is not very much of Clough in the piece. What Arnold really commemorates is the emotion excited by the pastoral loveliness of the scenes in which he and his brother poet, a companion of his college days, spent their dreaming youth, as yet untroubled by the contentions of the workaday world, still pursuing the gleam of a poetic imagination, still free to wander like Sicilian shepherds through «many a dingle on the loved hillside.» With one exquisite image after another Arnold evokes the feeling of early spring, the fragrance of whitening hedges, the cuckoo's parting cry, the rapture of young blood in June when the high midsummer pomps come on:

> " Roses that down the valleys shine afar,
> And open jasmine-muffled lattices,
> And groups under the dreaming garden-trees
> And the full moon, and the white evening-star "

Death and the call of the busy world ended this Theocritean holiday and harshened and silenced the music of these young singers, but by the magic of these two poems Arnold and Clough and the nameless Oxford lad will be associated forever, in the minds of all lovers of poetry, with the romance of the «home of lost causes» and the enchantment of the Eng-

lish spring. For periodical criticisms consult Smart, T. B., 'Bibliography of Matthew Arnold' (1892); books on Arnold by Saintsbury, George (1899); Paul, H. D. (1902); Russell, G. W. E. (1904); Dawson, W. H. (1904); Dixon, J. M. (1906); Sherman, S. P. (1917).

STUART P. SHERMAN.

SCHOLASTICISM (Lat. *schola*, "school"). Scholasticism is the philosophy of the "Schools." Charlemagne (742–814), inviting leading scholars of the Church to his court, established a Palatine School and a series of cloister and diocesan schools throughout his empire, and out of these as the mediæval centres of learning arose the scholastic philosophy. The term "scholastic" (Doctor Scholasticus) was applied not only to teachers of the seven liberal arts in these Carolingian institutions and the later established seats of learning, but also to teachers of theology and philosophy. The term gradually became narrowed to denote the latter class. The movement extends from 850 to 1453 A.D. and may be divided into two periods: (1) 850–1200, that is, from Johannes Scotus (or Erigena) to John of Salisbury and the Arabs; (2) 1200–1453, that is, from Alexander of Hales to the fall of Constantinople and the rise of Humanism. The first period is characterized by the controversy on the subject of universals. The second period is marked by the fusion of Aristotelianism with dogmatic theology, the delimitation of the spheres of faith and reason and the controversy regarding the primacy of the will over the intellect. In the first period the chief figures are Johannes Scotus, also called Erigena (that is, Irish-born, b. 810, d. 877, the earliest notable scholastic, fused Neo-Platonism with Christian theology, Gerbert (c. 1003 as Pope Sylvester II and distinguished for investigations in mathematics and natural science), Roscellinus (b. 1050, originator of Nominalism), Peter Lombard (d. 1164 as bishop of Paris, writer of the famous 'Sentences'), William of Champeaux (1070–1121, champion of realism against Abelard), Anselem of Canterbury (1013–1109, constructed an ontological argument for the existence of God), Abelard (1079–1142, originator of Conceptualism), John of Salisbury (1110–80, beginnings of reactionary attitude toward the one-sided scholastic culture). To the second period belong chiefly the following: Alexander of Hales (d. 1245, one of the originators of the 'Summa,' a sort of encyclopedia of theology and natural science, that attained vogue in this period), Bonaventura (1221–74, mystic), Albertus Magnus (Count of Bollstädt, 1193–1280, the most learned man of his age in the natural sciences), Thomas Aquinas (1225–74, fused Aristotelianism with Christian theology), Duns Scotus (1274–1308, advocate of the primacy of the will against the Determinism of the Thomists), William of Occam (1270–1347, important Nominalist and opponent of the temporal power of the papacy). The early schoolmen possessed among other works a meagre part of the logical treatises of Aristotle, Plato's Timæus, the writings of Boethius, Cicero, Seneca, Augustine, Martianus Capella and Pseudo-Dionysius the Areopagite. The latter schoolmen possessed the whole body of Aristotelian writings, and the works of the Arabs and Jews. One of the fundamental characteristics of the scholastic period is the subservience of philosophy to theology. Philosophy is under the rigid censorship of the Church and although the intrinsic spirit of scholastic philosophy may not be that of a "handmaid to theology" (*ancilla theologiæ*), yet ecclesiastical authority reduces it practically to that position. Its real spirit is no doubt the desire to harmonize rational and revealed truth, and not to diminish the claims of reason. Nevertheless, its historical function was not so much the discovery of truth, as the defense of dogma. The service demanded of philosophy is apologetic and, therefore, the discipline of logic is particularly important and widely studied. Knowledge is subordinated to faith. In the scholastic era the Church was the bearer both of science and religion, but as the interests of the latter were the primary concern of the Church and in its estimation the most important for man, the subordination of science to theology was, from the Church's viewpoint, both legitimate and necessary. Gradually, however, science and philosophy asserted their independent claims, and in the Renaissance, the rebirth of the Greek spirit and of the dignity and worth of profane culture,— reason assumed a distinctive position for itself. The result was a long warfare between science and theology, between reason and creed. Although scholasticism was a combination of Hellenic thought with the Church dogmas, yet the rationalistic spirit of Greek philosophy remained practically dormant during the entire scholastic period and did not really awake until the rise of Humanism. The most important question for early scholasticism was the ontological significance of logical genera or universals. In this controversy the scholastics split into two great parties, the realists and nominalists.

Realism is the doctrine that genera and species have existential reality, that is, they are entities, and extreme realists regarded such universals as existing apart from and independent of particulars. The formula for the extreme realists is that universals exist *ante rem* ("before the particular," Platonism); of the moderate realists that they exist *in re* ("in the particular," Aristotelianism). The extreme opposition was formed by the nominalists who maintained that universals or genera are only class names and have no existence apart from the name. A middle party was formed by the conceptualists or sermonists, who maintained that universals are concepts and have ideal existence as notions in the mind, or, as Abelard more specifically held, the word becomes universal by means of predication. The formula for nominalism and conceptualism is that universals exist *post rem* (after the particular"). These discussions of the Middle Ages were powerless to advance knowledge, being mainly exercises in abstract dialectic, although carried on with great subtlety and genius in logical analysis. The question acquired, however, an important bearing by involving the doctrine of the Trinity and the existence of God. According to the realists the greater the universality, the greater the reality; the wider the concept the more extensive its being. God, as the most universal notion, has the most complete reality; as *ens generalissimum* He is *ens realissimum*. Further, the nominalists regarded as real only the individual, concrete thing. The realists urged against this that according to nominalism, only the three persons (as individuals) of the Trinity have reality; therefore, there is no Godhead and we have Tritheism. For this consequence of nominalism Roscellinus was condemned at the Council of Soissons (1092). It was also maintained that if realism is not true, then such universal ideas as Humanity, the Church and Original Sin refer to no real existence. Anselm, "last of the Fathers," maintained that the universals existed before particular things in the mind of God. The most memorable controversy on the subject took place in Paris between William of Champeaux and Abelard, in which the latter gained a dialectic victory. Scholasticism reached its complete formulation in Thomas of Aquino ("Angel of the Schools"). Thomas developed a system of philosophy by the fusion of Aristotelianism with Christian theology and Thomism remains to the present time the most generally accepted system of Christian philosophy in the Roman Catholic Church. Thomas sought to correlate more precisely than his predecessors the spheres of faith and reason. Reality and truth are one continuous realm, although certain truths transcend reason and are apprehended only by faith. Truths that belong to the mysteries of faith are the doctrines of original sin, the creation of the world in time, the incarnation and resurrection of Christ, the Trinity and the final judgment. These are not demonstrable by human reason, but are matters of revelation and are assented to by faith. Faith and revelation do not contradict reason; they transcend it. Faith and reason together apprehend the continuous and harmonious reality of the supernatural and natural. It is not possible, according to Thomas, that what is true for faith may be false for reason. Yet many scholastics took refuge in the doctrine of a "twofold truth," asserting that what is true for reason may not hold good in theology. An absorbing question for the late scholastics was the psychological question whether primacy belongs to the will or to the intellect. Does the will determine our ideas, or do our ideas determine the will?— a question that was bound up by the scholastics with the will's freedom. Thomas is Determinist; Scotus is Voluntarist. It is the will or the intellect decisive for character? On the side of the primacy of the intellect (cf. the Socratic theory that virtue is knowledge) were ranged Thomas Aquinas, the mediæval Aristotelians, the German mystics and the Dominicans; on the side of the will Duns Scotus, the Augustinians, William of Occam and the Franciscans. On the question of universals Thomas and Scotus took similar ground, namely, that of moderate realism. Both maintained that the universals exist in the mind of God (*ante rem*) as ideas before creation, substantially and immanently in things (*in re*), and as notions and names employed by the individual mind (*post rem*). The revival of nominalism in William of Occam marks the growing interest in the world of particular, concrete things, as the only real things. The renewal of nominalism was symptomatic of the condition of the age, of a growing interest in empiricism; it stood for the reform tendency, and although in the 14th and 15th centuries it grappled with realism in a final struggle and was vanquished in the Church, it found outside a powerful ally in secular science in whose triumph it shared.

The philosophy of the Arabs during the scholastic era is essentially Aristotelianism combined with elements of Neo-Platonism (the emanation theory). Their interest was mainly in medicine, natural science and mathematics. The chief Arabic philosophers are Alfarabi (d. 950), Avicenna (980–1037), Algazel (1059–1111), and Averroës (1126–98), and they were important as the carriers of Aristotelianism and the seeds of natural science into Europe through Spain. The Jewish philosophy of the scholastic period is partly the Cabbala (a secret emanistic philosophy recorded in the works of Jezirah and Sohar) and Aristotelianism. The most important figure is that of Moses Maimonides (lived in Cordova and Cairo 1135–1204), who combined the sublunary philosophy of Aristotle with Hebrew theology.

The great and serious effort of scholasticism was to fuse philosophy and theology into a complete system free from inherent contradictions, to exhibit the harmony of natural and revealed truth, but the trend of modern thought has been to emphasize the breach between theology and science. The historical consequence has been that the original ascendency of the former over the latter has in the long struggle yielded to the asserted dominance of science over official creed. While it was the endeavor of scholasticism to unite the dogmatic theology of the Church with philosophy, it has been the endeavor of modern philosophy to divorce them and to erect a purely rationalistic and scientific system of truth. The philosophical significance of scholasticism is apt, however, to be underestimated. It was the interpreter of questions that were vital for that age, an age in which the one question was confined to the relation between revealed and natural truth. Their fundamental problems, however, the problems of universals, of the relation of faith to reason, of mysticism, of the claims of revealed truth, are neither artificial subtleties, nor are they as yet settled.

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SCHOLIA and **SCHOLIAST.** See SCHOLIUM.

SCHOLIUM, plural **SCHOLIA,** a marginal note or comment: specially such note or remark made upon a passage of any of the writings of the Greek or Latin classic authors by early grammarians. The writers of these scholia, the scholiasts, are mostly anonymous.

SCHÖNEFELD, shē'ne-fĕlt, **Henry,** American musician: b. Milwaukee, Wis., 1856. He studied in Leipzig in 1874–79, and afterward engaged in teaching, composing and conducting in Chicago. He was among the first composers to use the folk melodies of the American negroes. Author of two concertos and numerous instrumental pieces.

SCHOOL, The Corporation. A corporation school is one maintained by a business concern, and not under public supervision and control, having for its purpose the training of new employees for efficient service, or for the further training of older employees to fit them for positions of greater responsibility as foremen, executives or technical experts. Probably the first such corporation school was one established by the Chaix Printing Company, of Paris, France, in 1863. The oldest American school was founded by the R. Hoe Printing Press Company of New York in 1875. Most of the corporation schools now in operation have been organized since 1905.

The National Association of Corporation Schools was organized 24 Jan. 1913. The object of the association is to aid corporations in the education of their employees by providing a forum for the interchange of ideas, and by collecting and making available data as to successful and unsuccessful plans in educating employees.

Many different types of corporation schools are maintained and for every variety of purpose.

The «special training schools» are generally schools open to college graduates and other technical men. The students usually enter directly from college with little or no executive or business experience. Such schools aim to connect up as soon as possible the theoretical work of the technical school and the practical routine of the manufacturing or commercial institution.

The «company continuation schools» generally admit any employees who desire to enroll. Their purpose is to aid such employees to equip themselves for advancement by means of either technical or general training. Such schools are maintained by the Curtis Publishing Company, the General Electric Company, the International Harvester Company, the Standard Oil Company of New York, the Fox River Shipbuilding Company, the Yale and Towne Manufacturing Company and many others. Sometimes these schools are on a co-operative basis and the «study» part of the school is conducted under and administered by public or private school authorities. In the case of co-operation with public schools the «educational work» is usually paid for out of public funds. Frequently the company pays the student for the time spent in school as well as for that spent on productive work.

Special training schools and company continuation schools are maintained for the training of wholesale and retail salesmen and office workers, as well as for the training of persons connected with industrial enterprises and the business of railroading and transportation and public utilities.

«Schools for unskilled laborers» furnishing instruction in common school subjects or for the teaching of English to foreigners have been established in increasingly large numbers since 1916. One of the most fruitful sources of accidents in factories is the inability of foreigners to understand English. The teaching of English to foreigners is being fostered by the United States Bureau of Education through its Division of Immigrant Education.

In some States the work is being carried on under public guidance or under public supervision and control and at public expense.

The Ford Motor Company has enrolled as high as 2,700 foreigners in the Ford English School.

The trade apprentice schools are probably the most important type of corporation school in that they serve by far the largest number of employees. The National Association of Corporation Schools in 1916 reported almost 30,000 students in corporation schools maintained by member companies of the association. Apprentices are accepted usually at the ages of 16–20 and under definite agreement as to rate of pay, period of apprenticeship and character of training to be given. The academic and technical part of the apprentice training is frequently given on a co-operative basis in public or private schools, while the practical trade is given in the shop under the actual shop conditions. Sometimes a concern will set apart a special shop or section of the plant for the giving of the apprentice training, placing this department in charge of a foreman who serves as an apprentice teacher.

Under the terms of the Smith-Hughes Federal Vocational Education Act a portion of the funds which are distributed to the States for trade, industry and home economics education must be used if at all for part time or continuation schools under public supervision and control. It is, therefore, probable that practically all of the academic and technical instruction will be given to trade apprentice school students by public school teachers in the near future, either in the public schools or as is possible in the factories and business establishments.

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SCHOOL BUDGET. The modern school budget provides for a fourfold classification of school expenditures, (1) by *function,* or the kind of work performed. The functions of a public school system are (a) a regulative and executive service by the school board and the superintendent; (b) instructional service, subdivided into supervision and teaching; (c) proprietary service, consisting of the provision, care and disbursement of funds, supplies, equipment of buildings; and (d) auxiliary and social services such as health, library, lectures, recreation, provision for indigents, etc. (2) Expenditures by *character* showing the fiscal nature of the transactions as administrative, operative, upkeep and capital outlay. (3) Payments classified by *objects* of expenditure; (a) personal service; (b) services other than personal; (c) supplies; (d) equipment; (e) buildings and non-structural improvements. Finally a classification by *location* indicates the department office or school building or playground to which each payment is chargeable.

SCHOOL DISTRICT. See DISTRICT.

SCHOOL EXAMINATIONS. No successful means of testing knowledge or of determining intellectual progress without some form of examination has yet been devised. The history of education affords frequent evidence of the attempt to free school children from this universal bugbear. The examinations persist, however, and are freely employed by those who approve of them, by those who condemn them and by those who regard them as a necessary evil. The truth seems to be that no better way of gauging school progress has been found, or is ever likely to be found, and that it is the careless misuse, and not the legitimate employment, of examinations which so frequently condemns them. Examinations in some form or other characterize the administration of our schools throughout the country.

The State of New York has the most highly organized system. The country boy in New York who desires to become a physician, for instance, in pursuing the usual course, is advanced from grade to grade through a system of *grade* examinations, is admitted to high school through a system of *preliminary* examinations, is graduated from high school and admitted to college, or directly to a professional school through a system of *regents* or *academic* examinations, gains credit in college or professional school subject by subject by passing of examinations, and is finally authorized by the State to practise medicine by passing a medical *licensing* examination. The situation in other States does not differ materially so far as the individual is concerned. New York simply sets up the educational barriers more conspicuously than other States and exercises larger central authority in their administration.

Certain general principles may be said to underlie any system of school examinations which is calculated to be a sound means for producing a useful end and which does not confuse teaching with examining. These general principles may be stated as follows: (1) The examinations should be confined to soundly conceived and clearly announced courses of study; (2) Admission to all examinations should be predicated upon reasonable evidence of the successful completion of the courses of study upon which the examinations are based; (3) Persons actually engaged in teaching should have some part in the framing of question papers, and all examinations should be framed so as to discover what the candidate knows and can do rather than what he does not know and what he is unable to do; (4) Answer papers in all examinations should be rated by thoroughly qualified persons in accordance with settled methods of procedure, without settled determination in advance of the rating as to the exact forms or character of a perfect answer; (5) The credentials springing from examinations should be a reward of merit, and should have generally acknowledged value.

The examination system which is founded on these principles will not yet be free from criticism because the inevitable tendency of any examination system is to emphasize *stuffing* at the expense of *teaching.* The end of life is after all «not knowing, but being.» There is truth in the charge that teachers are often so absorbed in the sharpening of their tools that they almost forget the objects upon which they are to be used. Now an examination rightly used is never more than a tool, is not the object of all teaching, but only an incidental means of testing the results of teaching. The real danger in the employment of any examination system lies in the tendency to make the examinations fundamental rather than incidental. As tools in the hands of teachers, examinations serve useful ends in affording passports for individuals and in setting standards by which institutions may judge themselves; as the masters of teachers, examinations dwarf teaching and defeat the whole purpose of education.

Further reference to the system of examinations employed in the State of New York may serve to illustrate the above statements. The State does not offer any of its examinations as a mere intellectual game of chance. The underlying purpose of the State is missed entirely when whole school systems and when individual teachers employ examinations to test knowledge or to gauge capacity in the way in which we cast a die or toss a ball to settle a dispute. It is after all, as has been intimated, not the wise use, but the flagrant misuse of soundly conceived examinations, which not infrequently brings them into educational disrepute.

The experience of the New York country boy on his educational way to the practice of medicine may be in further point. The certificate of advancement from the fifth to the sixth grade or from the sixth to the seventh grade which he secures from the district superintendent of schools upon passing the prescribed grade examinations is not in itself evidence of sound primary training. The certificate means, if it means anything, not simply that the boy has passed certain examinations, but that he has spent a given time in school in the study of the subjects in which he has been examined, and that he has with some determinable degree of success pursued the courses laid down by the State and in the way suggested by the State.

The preliminary certificate which he later receives at the end of his grammar school course is not in itself proof of his ability to go on with work of high school grade. If the certificate has any value whatever, it must carry with it not simply evidence that its possessor has passed reading, writing, spelling, geography, arithmetic, elementary English and elementary United States history in the preliminary examinations, but also that he has completed the work of the elementary school course through the eight grades as laid down by the State in its elementary course of study, and that he is believed to be ready for advancement.

The academic diploma or college entrance diploma which the young man secures at the end of his high school course as a result of academic examinations taken throughout that course is not, if it is worth anything, the product of the casting of a die or the tossing of a ball. It is the reward given by the State to a faithful student who has put in four years of serious successful study in a school of approved grade, and is the official declaration of the belief of the State that the holder is qualified to begin advanced work in college or professional school. It is not simply a record of creditable passing marks. It is official evidence of one's profitable association with his fellows for four years. It is official evidence of the accomplishment of a purpose.

The medical licensing examination which this patient youth meets in turn after long in-

tellectual discipline is simply the means employed by the State to determine who shall and who shall not practise medicine; in other words, to separate medical practitioners from other persons. The State's chief concern in the licensing of its physicians is not in its own examinations which admit to practice but in the sound preliminary schooling of the candidate and in his four years of systematic study of medicine in an approved medical college. The examination is the State's label and not its fundamental concern.

Thus it can hardly be too strongly urged that any system of examinations, however constituted, should be a means and not an end of teaching. The examination never ought to be of itself alone a court of last resort to determine the knowledge and power of a student; it should be only one of the many useful agencies employed by a wise teacher incidentally to impart knowledge and fundamentally to develop power. Wisely used and properly controlled, a soundly conceived system of school examinations may do unmeasured good; allowed to dominate teaching and to control schools, it may become a positive menace. The school, or the system of schools, is safe which *uses* examinations and does not become *possessed* by them.

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SCHOOL GARDENS. In America, school gardens originated in the city. The children of congested living show a marked loss in certain broad educational attainments. Training in the care of living plants and of animals will supply in a large measure this necessary development. This training will give sympathy, love for the beautiful, ability for self-support, physical vigor and moral stamina.

The high cost of living, and particularly the intensive necessity for food production brought on by the World War of 1914, has greatly emphasized the school-garden work. The potentiality of the backyard garden in suburban parts of cities and towns, and the great value of the garden at the school as a model and as an incentive, has been increasingly accepted since 1914.

The school garden is a term used to cover the agricultural operations conducted under the auspices of the school. The garden may be at the home of the child, on a vacant lot, in a park or on school grounds. It is still a school garden so long as the school controls or directly influences it. Children's gardens conducted by other agencies than the school, such as gardens conducted by commercial institutions, welfare associations and private individuals, are properly called school gardens in the sense that the agencies operating those gardens for children are undertaking an educational function. This work is, therefore, properly the school-garden work of the conducting agency.

Valuation.—Almost every possible educational value has been given to school gardening. It is undoubtedly of the greatest physical benefit for growing children to work in the open. Children must also learn much of natural phenomena, growing plants and the living organisms given to their care. A full discussion of these more evident values could be carried on profitably at great length, but the particular necessity of school gardening for city children lies in the following comments:

Background of Experience.—Before the child can learn to talk and write and compute with forcefulness, he must have come into intimate knowledge with things, and especially with animate things, in order that he may have something to talk about, or to write about, or to calculate upon. He must live the life. He must come into the experiences of his race. The city child is peculiarly denuded of these human experiences. The child that trains a plant from seed to fruit must learn not only to love the plant but he must acquire the skill to grow plants.

Idealization of Best Living Conditions.—The school garden that does not blossom in the home garden is a poisonous weed. The child will never do at home that which is beneath his teacher at school. When there is a garden at the school and the teacher works with the child, then gardening becomes positively worth while; it has its social valuation. Father, mother, and child alike, become proud of the home garden. If they have no home garden, they move into less congested quarters, where they can have a home garden. This is the result of the idealization of garden work under the auspices of the school. The school and the church naturally establish the ideals of any community.

Self-Support Emphasized.—The school garden, when managed properly, must tend toward teaching self-support. The child soon learns that he can grow something of value and that that value is real food. He learns responsibility and his place in the world as a worker and a supporter. He comes into a feeling of ownership and of positive individuality. He differentiates himself from his fellow. He thinks in terms of freedom. He acquires high incentives of attainment, and higher ideals of sympathy, love and brotherhood.

History.—In America, the school garden movement had its beginning in the city of Boston in 1891, when Henry L. Clapp, principal of the George Haven Putnam School, established a wild-flower garden at his school. This beginning was formally published as a school garden, and the efforts in the schools of the country, which have been more or less regular, doubtless originated from this beginning. It is notable that in this effort in Boston, and in all the efforts that have followed it, the education of children has been the great aim. America has not taken up school gardening so much by way of increasing agriculture as to increase the potentiality of education. The school garden has been considered everywhere the laboratory of natural science, and has been further looked upon as a valuable all around means of child training. This motive was very different in the inception of school gardening in Europe. We find that as early as 1869 Sweden and Austria passed laws requiring the wide establishment of school gardens. France did so in 1880, Russia, Belgium and England followed with school garden requirements. In Switzerland, however, we find that education by means of school gardening was a large motive in the work, but in all other countries of Europe it appears to have been undertaken to promote agriculture as an industry. This





1 School Garden, Public School 89, Brooklyn, N. Y.
2 A class at work on a 10-acre School Farm at Pelham Bay, Bronx, New York City

motive materially affected the method of teaching school gardening in Europe so that little has been gained by those teachers in America, who have gone abroad to study school gardening, that could be directly adapted in this country.

In 1904 Sir William Macdonald, of Montreal, Canada, established some 20 gardens in the various provinces of Canada. This became the initiative of a great interest in elementary garden work in Canada, and large grants on the part of the Dominion government have been made to encourage the work since that time.

In 1897, John H. Patterson, of Dayton, Ohio, founded a boys' garden at the National Cash Register Company grounds. This was the first and most successful children's garden known in America. Nearly all of the children's gardens, especially those conducted by welfare organizations and private individuals, have imitated this endeavor in Dayton, Ohio. For more than 20 years Mr. Patterson's effort there has grown and has become more thoroughly established with each season. Early in the century a number of normal schools established school gardens, notably the one at Hyannis, Mass., and it is reported that the Cook County Normal College, in Chicago, had a school garden in 1885. In 1900, the Cleveland Home Garden Association sold penny packets of seeds through the schools to the children of Cleveland. This originated a plan of seed distribution which has been taken up by a number of other cities as well as commercial houses and has greatly facilitated the movement. In 1902, Mrs. Henry Parsons, of New York, started the Children's Farm in the De Witt Clinton Park. This farm and three other large farms have been maintained by the Park Department of Manhattan ever since that time.

Cleveland, Ohio, and Philadelphia, Pa., were the first cities to formally accept school gardening as a part of the regular school work. These cities have conducted regular school garden work for more than a decade.

The United States Bureau of Education, in 1914, established a school garden department. It emphasized the home garden side, and termed it «School Supervised Home Gardens.» This work has grown, and has lately been given a large Federal grant to operate the United States School Garden army, so that in the last 25 years the school garden movement in America has become a distinct educational factor and a distinct economic gain in accelerating love and interest in garden work in thousands of schools and millions of homes in the United States.

School Garden Types. *The Garden at School*— Indoors, the school can support the schoolroom window box and schoolroom flowerpot. The greenhouse on the roof of school buildings is the most practicable, and it may serve as the laboratory for nature study and the natural sciences as well as in part for physical science. Plants may be planted at school by the children and then taken to their homes to be grown, and later exhibited at the school. Class lessons in care of plants, planting seeds, transplanting, watering and other exercises can be easily conducted in the schoolroom. The outdoor garden at the school should be as near to the school building as possible. It should be on school property and large enough to contain 40 plots, each plot not smaller than 50 square feet. This will accommodate one class, or grade, and presupposes that all children may have direct work in the school garden, at least during one grade of their school course. One teacher in a given city school should be the teacher of gardening, and preferably a teacher of elementary sciences as well. The garden work should be part of the curriculum, and credit for it should be given as for any other subject.

The best vegetables to begin with in school garden work are evidently the hardy, short season varieties. Beans, beets, kohl rabi, radish, Swiss chard, cabbage, tomatoes, carrots, lettuce, corn, are undoubtedly the best. The best flowers for school garden work are likewise the hardy annuals and long blooming varieties. Sweet alyssum, nasturtium, marigold, asters, zinnia and cosmos are leading varieties.

It is always best to fence the school garden, if not to protect against petty thievery, then it should serve to keep out dogs, cats and other small animals. The school garden should be supplied with running water; should have good drainage; should be in the sunlight and should be richly fertilized. The work may be done with few tools, but a hoe should be supplied for every pupil. Rakes, watering cans, hand weeders, spading forks and garden lines are the principal additional tools required.

The Garden at Home.— The garden at the home of the child has hardly been operated by the school long enough to develop acceptable standardization. There is a general agreement, however, that a home garden, managed by the schools, should be visited by teachers, or those who understand gardening, as frequently as possible. The child should keep a complete record of his garden work according to acceptable standards, and his record should be examined and rated. His garden should be rated at each visit, and instruction should be given in the garden, as far as possible, but the major part of the instruction must of necessity be given at the school garden, if the expense of home garden work is to be kept within the possible appropriation. It would, therefore, seem that the school garden and home garden must go hand in hand if any high attainment in gardening is to be accomplished.

Management of School Gardens.— In the management of school gardens the point of view is important, and on account of agricultural demands the education of the child is very liable to be subordinated. The child is greater than the produce. In other words, it is much better that a child plant a row of radish seeds with his own hands, and cover it with his own hoe, than it is to have the teacher plant that row while the child looks on. The radishes planted by the teacher would undoubtedly do better than the radishes planted by the child, provided the skill of the teacher is what it should be, but the child is undoubtedly taught much better by doing every possible agricultural act himself in the school garden.

Individual Project.— This is undoubtedly the very best means of facilitating successful school garden work. Every child who is able to do garden work should work out his own individual project or problem in agriculture on a plot of ground assigned for his sole use.

This individual plot of ground may vary in size according to the age, sex and experience of the child, as well as neighborhood limitations, from 50 square feet to 800 square feet. As a rule it is best that no individual worker grow less than five vegetables, presupposing that these five vegetables may be followed by four or five others at a second planting. This produce provides for educational experience and also for a continuity of interest. For example: If a child were to plant his entire plot to lettuce, he might take the entire crop of lettuce out on the 20th of June, and his interest, of course, could not be retained in his work during the rest of the season.

Produce for the Child.— Each child should have the produce which he raises on his own individual plot. This gives educational experience and retains interest. When conducted by the school, the direct collections of money for produce is most objectionable. It, therefore, should not be undertaken. However if funds are greatly needed by a given agency undertaking school garden work, it would seem as if each individual worker might be taxed a certain percentage of his produce to maintain the common garden.

Course of Study.— One of the greatest hindrances to school garden work is that it has found such slow acceptance in the regular course of study of the school. This has doubtless been due to the fact that the schools are not in session during the chief growing season, which is summer. Shop work, cooking and other manual arts have been placed in the curriculum, and credit for attainment has been given to pupils. But not so generally with school gardening. School gardening can never come into its own until it is placed in the curriculum, either as an industrial art or as a natural science. Pupils who attain the desired standards should be given credit.

School Program.— Another thing that has hindered gardening in schools has been the fact that the work can be done outside of what are termed the regular school hours, so that many schools have failed to program school gardening at all as a regular exercise. It, therefore, loses value with teacher and pupil alike. It should be done continuously or not at all. Consequently, the movement has suffered greatly from gardens not properly attended to, which have grown up to weeds.

Garden Teacher.— The school garden teacher should be one of the regular teachers in a given school. The departmental plan of teaching provides for sufficient specialization. The teacher of the sciences, as a rule, should have charge of school gardening.

Support and Control.— If school gardening is worth while as an integral, educational factor, then it is worth regular public support. The school appropriation for a given city should carry the school garden work. It is indeed unfortunate that welfare organizations have too frequently been entrusted with a burden too great for them to carry long, and hence valuable and devoted effort have frequently ended in dismal failure. Every city in the land with a population over 100,000 should employ a school garden director to administer this work.

The possibilities of food production in large cities where great suburban tracts have been divided up into partly improved city lots have grown out of the school garden development. In many cities large community gardens have been successfully managed. The people have formed a garden club and the nearest vacant lots have been divided into family plots of from 800 square feet to 12,000 square feet each. The features of the Community War Garden have been a number of small family gardens in one group, and these gardens have been upon vacant lots. Some few communities have been able to maintain the gardens in walking distance of homes. A great variety of management has resulted. A city department for food production and conservation should follow these food gardens in our cities. The growth of school gardens has been most striking. Nearly every city in the United States and Canada now has some form of school gardening. The United States School Garden army reports an army of 1,500,000 children gardeners for 1918.

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SCHOOL LUNCHES. See RETARDATION OF PUPILS.

SCHOOL NURSES. See RETARDATION OF PUPILS.

SCHOOL PLAYS. See FESTIVAL.

SCHOOL SANITATION. See EDUCATION, ELEMENTARY.

SCHOOL SAVINGS SYSTEM. The school savings system was introduced in the United States in 1885 by Prof. J. H. Thiry, Long Island City, N. Y., being the location of his initial efforts. His interest in the work was continued until his death in 1911 and thereafter was carried on by Mrs. Sarah S. Oberholtzer of Philadelphia, until taken up by the savings bank division of American Bankers' Association. In 1910, when Professor Thiry's last report was made, there were in operation school savings banks in 530 school houses with 16,488 depositing pupils having $721,732.18 to their credit. Since that time there has been a notable development of the system. According to the statistics for the year 1921–22 (the latest available) school savings banks have been established in approximately 5,000 school buildings in towns and cities throughout the United States. The enrollment in these schools aggregated 2,206,132; and the number of participants (depositors) was 1,295,607 or 60 per cent of the enrollment. Deposits during the year exceeded $5,500,000 and the balance due on 30 June 1922 was $6,518,171 with interest credited to the amount of $145,554.

SCHOOL SAVINGS.

DIVISION	Number towns	Number school buildings	Pupils enrolled	Number of depositors	Amount of deposits 30 June 1922
New England States	54	831	266,435	124,628	$269,853 98
Eastern States	105	1,306	713,190	474,670	3,054,375 87
Southern States	49	494	235,534	146,746	466,297 56
Middle Western States	136	1,445	758,888	458,061	1,815,559 59
Western States	12	113	54,515	29,646	180,244 17
Pacific States	14	596	177,582	61,856	731,839 49
Total United States	370	4,735	2,206,144	1,295,607	$6,518,170 66

SCHOOL FOR SCANDAL, The. Sheridan's 'The School for Scandal' was produced 8 May 1777, by the author himself as manager and part owner of Drury Lane Theatre, which he had taken over some time before from Garrick. Unlike the earlier 'The Rivals' the play was an instant success. It ran 20 nights the first season; 65 nights the second season, and has held the stage ever since.

'The School for Scandal,' the only play of later date to challenge comparison with Congreve, may be studied as an index of dramatic tendencies since the Restoration. The movement for correcting the morals of the stage, traces of which were seen in 'The Way of the World,' have now culminated in a definite brand of technique. Though scandal is spoken in the play none is actually seen in the action. The polite subterfuges demanded by modern English taste have begun. The tradesman has been introduced into comedy. Moreover, though Sheridan ridicules sentiment, the primary action of the play revolves around a sentimental motive. Joseph Surface is a false sentimental hero, while Charles Surface is a true sentimental hero. Oliver and Rowley are characters from sentimental comedy.

'The School for Scandal' is of the school of Congreve once removed. Whereas Congreve conventionalizes life, Sheridan conventionalizes the stage. With Congreve, wit is the specific; with Sheridan it is entertainment. 'The School for Scandal' is a crowded fabric of "situations" derived from a broad reading of English comedy and an intimate acquaintance with the stage. Much worked over in composition out of scattered scenes and different plays, the central idea of a school for scandal goes back to the cabal nights of Lady Wishfort in 'The Way of the World.' Action has become more important than speech, and events follow each other in rapid succession. There is little repartee. The brilliancy of give and take gives way to broken monologues. Dialogue serves not as a fencing of wits but as the rapid patter of characters manipulated through a foreordained intrigue. To keep the conversation running rapidly is the first requirement. Therefore a spirit of raillery is maintained.

When these things are said it must be admitted on the other side that the play occupies a significant position. It was the last of the comedies of manners and the first of the modern plays of entertainment. The former were written for the discriminating; the latter for the crowd. The plot is regular and expert in the handling of a crowded action. In theatrical "effects" the play has been a storehouse of devices for a century of writers of comedy. On account of its adjustment of old materials to the requirements of the new day the play has maintained vitality unabated to this day. Editions: Rae, W. F., ed., 'Sheridan's Plays now Printed as he Wrote Them' (1902); Nettleton, G. H., 'The Major Dramas of Sheridan' (1906); 'Everyman's Library' (Vol. LCV); 'The Temple Dramatists.' Consult Sichel, W. S., 'Sheridan from New and Original Material' (2 vols., 1909); Rae, W. F., 'Biography' (2 vols., 1896); Oliphant, M., 'English Men of Letters Series' (1898).

THOMAS H. DICKINSON.

SCHOOL SUPERINTENDENT. See EDUCATION — OFFICE OF SCHOOL SUPERINTENDENT.

SCHOOL SYSTEM, Public. See PUBLIC, or COMMON SCHOOLS.

SCHOOLCRAFT, skool'kräft, **Henry Rowe,** American ethnologist and author: b. Watervliet, Albany County, N. Y., 28 March 1793; d. Washington, D. C., 10 Dec. 1864. He was educated at Middlebury and Union colleges, in 1820 was made geologist to an exploring expedition under Gen. Lewis Cass to the Lake Superior copper region and the upper Mississippi, and in 1822 became Indian agent for the northwestern frontier, with headquarters at first at Sault Sainte Marie and later at Michilimackinac (or Mackinac). From 1828 to 1832 he was a member of the Michigan territorial legislature. He commanded in 1832 the expedition which discovered the sources of the Mississippi, and in 1836 concluded with the Indians about the lakes a treaty by which cession of 16,000,000 acres of land was made to the United States. Soon afterward he received the appointment of acting superintendent of Indian affairs and disbursing agent for the northern department. In 1847, he began the preparation, under government appointment, of his elaborate work, 'History and Statistical Information Respecting the History, Condition and Prospects of the Indian Tribes of the United States' (1851–57). For the first five volumes an appropriation of nearly $30,000 per volume was made by Congress; the sixth and last was published at the expense of the War Department. The work was finely printed, and illustrated by 336 plates. It was the first means of introducing Indian legend and tradition to the general reader and gained a considerable reputation as a work of scholarship. Parkman, however, whose opinion is of very high value, considers that the work was quite inadequately done; particularly in view of the unusual facilities placed at the author's disposal. Among Schoolcraft's other volumes are 'Algic Researches' (1839); 'Oneota; or Characteristics of the Red Race of America' (1844); 'Personal Memoirs of a Residence of 30 Years with the Indian Tribes' (1851); and 'Scenes and Adventures in the Semi-Alpine Regions of the Ozark Mountains' (1853).

SCHOOLEY PENEPLAIN. See PENEPLAIN.

SCHOOLS, Bible in the. The Bible may be used in schools for one or both of two quite distinct purposes. It may be used for the purpose of establishing or confirming religious convictions or it may be used simply to give familiarity with and appreciation of a great body of poetic and historic literature, the most important, perhaps, that the world has produced. The use of the Bible for the first of the purposes mentioned is, in the nature of things, restricted in all countries where there

is no established Christian church. In the United States where all sects and all denominations stand upon an equal footing, it would be manifestly improper to levy a general tax to maintain religious instruction, which, in many cases, would be heresy to some. In private institutions founded by particular religious organizations and maintained for the purpose of promoting and fostering particular religious sects, Bible instruction would be not only eminently fitting and proper, but, in fact, essential to the accomplishment of the purpose for which such schools exist.

In the early colonial days in the United States, schools were, for the most part, maintained by the churches. Religious instruction based on the Bible was, in the schools at that time, an essential part of the curriculum. But public education in the United States has now become thoroughly recognized as a State function and as a result religious instruction has been excluded from the public schools. In a few cases, for example, in New York City, the reading of the Bible without comment is a daily exercise required by law, but such cases are few. In most States of the American Union the reading of the Bible in the public schools without comment is permitted by the common law if no objection thereto is made, and the practice of such reading is quite general, but where the question has been raised, the decisions of the courts have been uniformly against the practice.

Victor M. Rice, State superintendent of public instruction in New York State in 1866, said that «the proper places in which to receive religious instructions are the churches and the Sunday schools.» Judge Lyon of the Supreme Court of Wisconsin in an opinion given in 1890 holds that the reading of the Bible in the public schools constitutes sectarian instruction. Decisions of the same tenor have been given by superintendents Weaver, Gilmore, Van Dyke, Rice, Spencer and Ruggles of New York State, and similar opinions have been rendered in other States.

But this exclusion of religious and Bible instruction from the public schools has not in any degree lessened the belief in the importance of such instruction, but has resulted in a new movement, which has for its purpose a wider dissemination of knowledge regarding this great literature through study carried on outside the school, but still having certain relations to the school.

We are just beginning to appreciate the fact that knowledge and culture in any field may be acquired outside the school. Formal regulations have been adopted in many States for giving credit toward the completion of a high school course for study carried on outside the school and this plan has been extended in many States to include credit for Bible study. Such work is already definitely organized in the following States: Arkansas, California, Colorado, Idaho, Illinois, Indiana, Iowa, Kansas, Michigan, Mississippi, Missouri, Nebraska, North Dakota, Ohio, Oklahoma, Oregon, Texas, Virginia, Washington, West Virginia.

The plan adopted varies somewhat in the different States but in the main it includes the following definite features:

(1) A syllabus indicating definitely the parts of the Bible that are to be studied and the points that are to receive special attention.

(2) A definite period of study at home or in Sunday school under the instruction of parents, Sunday school teachers, or ministers of the gospel.

(3) A written examination conducted at the school by the school authorities.

(4) The crediting of the subject, if the examination is successfully passed, toward a regular high school course.

In many cases the syllabus and the question papers are prepared by committees which contain Catholics, Protestants and Jews, and the answer papers are read and rated by similar committees.

Courses have been arranged on this general plan covering full four years with specific assignments for each year.

Following is the outline of the course now in operation in the State of Colorado:

Course I. Heroes and Leaders of Israel.

Course II. First Semester. The Friends and Followers of Jesus.

Second Semester. The Life and Labors of Jesus.

Course III. First Semester. Bible History.

Second Semester. Biblical Literature.

Course IV. Social Institutions and Social Application of Bible Teachings.

1. The Family and the Community.
2. The State and the Church.
3. The Industrial Order.

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SCHOOLS, Continuation. The term «continuation school» may properly be applied to any type of organized educational effort having for its purpose the continuation of the education of children or of adults after they have left the usual elementary or secondary schools as regular attendants and while they are engaged for part or the whole of their time in gainful occupations. Under this definition the term would include (1) night schools, (2) part-time schools, (3) special industrial schools carried on by business organizations. (4) correspondence schools, (5) University extension courses, (6) the educational work of the Y. M. C. A., the Y. W. C. A., the Boy Scout Movement, the Girl Scout Movement and home reading circles of various kinds. There is a present tendency, however, to limit the term «continuation school» to schools offering part-time instruction to boys and girls under 18 years of age and who are engaged regularly in gainful occupations.

The United States Federal Board for Vocational Education gives official sanction to the following definitions:

"A part-time school is a school open to minors and adults who have entered upon employment. When the school aims to complete general education, it is designated a part-time continuation school; when it aims to increase skill and intelligence in a vocation other than that in which the pupils are employed, it is a part-time trade preparatory school; and when it provides training that is strictly supplementary and related to the employment of its pupils, it is a part-time extension schoo.."

The need for the existence of continuation schools is found in the fact that even under compulsory attendance laws, a large number of children of 14 years of age or over are obliged to leave school and go into industrial employment before they have completed even the elementary grammar grades, while the general education of those who leave school after having completed the grammar grades is frequently so defective that their opportunities for advancement after entering an industrial occupation are very limited. From the investigations of the Elementary Board for Vocational Education it appears that in the United States «there are about 5,000,000 children between 14 and 18 years of age out of school, and that practically all of the boys and a large proportion of the girls not at school in these ages are at work. A very large proportion of these workers have left the public school without completing an elementary education or preparing themselves for any specific vocation.» Moreover, modern industrial conditions tend to make the kind of occupation open to this class of children extremely monotonous and deadening to all intellectual activity. Such occupations consist usually of the repetition of a single simple operation or the operating of a single machine; hence, there is offered almost no opportunity for acquiring general knowledge of any trade as a whole and consequently almost no opportunity to progress in earning ability such as was afforded under the now almost obsolete apprentice system.

The principal specific purposes of schools organized to meet this situation are: (1) general education looking toward general culture, broader vision and better citizenship; (2) prevocational training and vocational guidance looking toward the better adjustment of the individual to his job; (3) training for a specific industry; (4) instruction supplementary to that received in the shop or factory practice in which the student is engaged, looking toward improvement in such practice; (5) instruction in homemaking for girls. The evening school was the earliest form of continuation school and such schools have been in existence in most European countries as well as in the United States for about 100 years. At the beginning such schools were intended to give instruction in the three R's only and were attended chiefly by those whose early education had been entirely neglected. Gradually the field covered has been extended until at present, in many cases, they offer complete high school courses in the subjects regularly offered in the day high schools, but the trend is toward industrial and commercial courses and homemaking. Evening schools, which are tax-supported, now exist in most of the cities and larger towns of the United States and of Europe. Attendance upon these schools is mostly voluntary, but certain classes of students who have failed to complete courses in elementary schools are required to attend either evening high schools or some other form of continuation schools.

One serious difficulty in the way of attaining the desired end of a continuation school through the evening high school is in the fact that the student fully employed during the day is not in physical or mental condition to benefit to the fullest extent from evening study and instruction. To avoid this difficulty, part-time schools have been organized. In these schools students are occupied in regular remunerative employment for a portion of the regular working hours and are in school during the remaining working hours, work and school thus alternating. In some cases students are employed alternate half days and are in school alternate half days. In other cases entire days are given to work and alternate days to school. In still some other cases alternate weeks are given to school and to work. In this way a uniform attendance is secured time school students are divided into two equal groups. Students working in any particular shop, factory or business concern are divided into two groups which alternate, one group being in school, the other group being at work. In this way a uniform attendance is secured both in school and on the job thus permitting the employment of a constant teaching force and a constant working force. The special school organized and conducted by business concerns aims more particularly to give to the employees of the concern such instruction as will render them more efficient in the particular work which they are called upon to do. Such schools are of more recent development and are increasing in number. In these schools the usual procedure is to combine in each day's work some hours of instruction and some hours devoted to the regular occupation. The special schools conducted by the New York Central Railroad and by the Wanamaker stores are well-known examples of this sort of organization.

In some of the States, notably in Pennsylvania and Wisconsin, statutes provide that children between 14 and 16 not in regular attendance at day schools, whether at work or not, must attend continuation classes for certain hours each week, and if such children are employed they must be released from employment during these hours, and the laws in these States also provide that schools must be established and maintained under public instruction and control for this purpose. Movements in several other States are already under way looking toward the enactment of similar laws. It is evident that the time is not far distant when provision will be made for the compulsory attendance upon some form of continuation school for all children up to 18 years of age who are not regularly in day schools, whether such children are employed or not, and that schools providing the opportunity for instruction of such children especially along vocational lines will become a part of the regular educational system of the country and will be under public supervision and control.

In most of the countries of Europe the part-time vocational school has reached a notable degree of development. For details concerning the development of this movement in the United States, reference is made to the reports of the Federal Board for Vocational Education, Washington, D. C.

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SCHOOLS, Inspection of. Various agencies exist throughout the country for the visitation and inspection of schools. Many State universities employ an officer known as a high school visitor whose business it is to determine what schools shall be placed on the university's accredited list for entrance. Such an officer does not ordinarily have any legal

authority but is usually a welcome visitor because of the desire of all ambitious high schools to be enrolled on the accredited list of their neighboring university. Private universities, colleges and college entrance boards also maintain like friendly relations with the secondary schools which prepare students for them. Systems of inspection are also maintained by sectarian organizations for schools under their jurisdiction.

Beyond these various private agencies, practically every State in the Union now makes attempt through its department of education or public instruction to inspect its schools. This authority is frequently exercised especially for the elementary and rural schools through county or township officers. In many States the power of the State department is limited both by statute and by the funds available for the purpose. The State of New York has perhaps the most thorough system of school inspection in the country both through the exercise of central and of delegated authority. The rural schools and the smaller union schools outside of cities and villages of a population of at least 5,000 are subject to the frequent inspection of a group of 207 district superintendents, who are in turn under the immediate supervision of the State department of education. The authority of the force of State inspectors may also be exercised in these schools by direction of the central office, but the State's immediate staff is concerned chiefly with the work of the secondary schools. A brief review of the working of this central system of inspections will present the problems common to all the States. New York's educational system is spreading its influence to other States. The examination system is the backbone of the educational scheme; in one form or another it constitutes the structural framework of the State's relations to its elementary and secondary schools and has an important bearing on the inspection work of the department. The inspection of schools is predicated upon the examination of students, and the valuation of the work of school systems, through the medium of examinations. The examination system inevitably brings to light the result of poor teaching and unwise administration and it is the distinct business of the inspectors with their first-hand knowledge of the weak spots to help schools to provide better teaching and to institute sounder administrative methods. Inspectors find that their work in the field is sharply divided between questions of administration and instruction. The large problem with which the department is confronted in the one-, two- and three-year academic schools, and in the full high schools in the union free-school districts outside of the villages and cities, is primarily one which calls for the qualities of a general practitioner rather than those of a specialist. Questions of sound organization, orderly procedure and definite purpose take precedence even over the always important question of the quality of the teaching. There are upward of 200 changes in principalships in these smaller schools every year. Many of these smaller schools are in a special sense the wards of the State because their frequent changes in management and in entire teaching force as well make continuing local policy impossible. If their work is to be carried on coherently from year to year and if purposeful results are to be secured, it must be through the immediate helpfulness of the general practitioners of the field staff of the department. The representative who goes into these schools need not be a specialist in this subject or that, but, like the country physician who treats a multitude of ills, he must be an accomplished general practitioner. He must know the courses of study, elementary and academic; he must know the ideals and the aspirations of the leading teachers of the State; he must know how to organize a school, how to lay out a program, how to conduct a recitation and how to observe a recitation politely, kindly and sympathetically. He must know how to correct without reproving, how to advise without complaining and how to praise without flattery. He must know the requirements of the mandatory statutes; he must know good housing from bad; he must know how and where to provide for library and laboratory. He must know human nature well enough and be trained keenly enough in a sensible diplomacy to be able to convince principals and teachers that he means at all times to help them; and he must have iron enough in his constitution, when occasion demands, to deal straight forwardly with a recalcitrant school board. In other words, he must use his good sense quite as much as his erudition.

The highly trained specialist finds a broader field of course in the more stably organized schools. In the larger union schools and in the high schools in the villages and cities, where questions of school administration are in the main matters of settled policy and are ably cared for by local supervisors, the department specialists find wider opportunity to aid teachers in their several groups of subjects, and to set up guideposts as possible attainable standards for all alert, progressive teachers. And the day is coming when the teaching profession will not have room for any others. It is here that the capacity of the field staff is put to its test on its scholarly side, and it is here that its service, if it is to be worth while, must in the long run be of the most significance. A body of trained men, each doing intensive work in a limited field, observing in the course of a year or two the best and the worst teaching in the State, must become in time a clearing-house, from which teachers who seek help may get inspiration and may find out what other successful teachers are doing. There are many schools, soundly organized, with thoroughly trained teachers, where the State cannot be of special service but where it can get help and suggestions to carry to other less fortunately situated schools. All that is best, it is the business of the State to distribute as widely and as generously as possible. See SCHOOL EXAMINATIONS; STATE SYSTEMS OF EDUCATION; UNIVERSITY OF THE STATE OF NEW YORK, and related topics.

SCHOOLS, Instruction in Sex Hygiene in. The importance of the reproductive function in its relations to general hygiene, the alarming prevalence of venereal disease and the amount of damaging misinformation intentionally disseminated by vendors of patent medicines are among the most important reasons that have been urged for the giving of regular instruction in sex hygiene in schools. A feeling of delicacy regarding all reference to sex that has been developed through centuries of custom, a lack of scientific knowledge of the subject on the part of ordinary teachers, the difficulty of securing reliable data from any considerable number of normal persons and the fear that conscious attention to sex will tend to aggravate rather than to ameliorate objectionable conditions are reasons urged in opposition to the giving of such instruction.

During the period from 1912 to 1915 the subject of instruction in sex hygiene was prominent in the programs of educational associations, and articles on this subject were not infrequent in educational periodicals and in the secular press. During the same period a considerable number of books were published treating various phases of the general question; but since 1915 the subject seems to have been dropped almost entirely and it does not appear that the agitation had any considerable results so far as concerns the introduction of such teaching into the elementary or secondary schools. The one tangible result of the agitation mentioned has been a more candid and fearless discussion in the public press of the extent and consequences of venereal diseases in such a way that this information is now being brought to the attention of all pupils and teachers who read current magazines and newspapers and in a manner that is not open to the principal objections urged against direct school instruction. The need for such direct school instruction in this phase of the subject is, therefore, largely removed.

It is very doubtful if we have yet reached a point where other and important phases of this subject may be properly and profitably introduced as a regular subject of instruction in the public elementary or secondary schools. While it is possible that the problem of general sex hygiene may at some time in the future be discussed in the public schools as scientifically and as frankly as we now discuss circulation, digestion and excretion, it is clear that such a course is not possible under present conditions.

The best high schools are now laying a foundation for such instruction and are preparing the public mind for it by a frank treatment of the fundamental facts of sexual reproduction in plants and animals in connection with the study of botany and of general zoology. Most textbooks in these subjects now present the essential anatomical and physiological facts underlying this subject frankly, scientifically and in a manner that does not offend genuine modesty. It is doubtful whether the schools should attempt generally to go farther than this at the present time. The wise teacher of general hygiene will always impress upon pupils the sacredness of every organ and every function, the importance of cleanliness, of the avoidance of all excesses and abuses, and in that manner will be able to reach the end sought. The problem is not so much one of overcoming ignorance as one of establishing a due respect for the body as a whole. For the present it seems wise to leave more specific instruction to parents or to conferences of teachers with individual pupils after a full understanding between the teacher and the parent of such pupil.

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SCHOOLS, Open Air. See HEALTH EDUCATION.

SCHOOLS OF DRAMA, Modern. There have been five great periods of dramatic production in Europe since the Middle Ages. The first took rise in England about three and a half centuries ago, its central figure being the immortal Shakespeare. The next was located in Spain. Temporally it was almost coincident with the first, and its two greatest exponents were Calderon and Lope de Vega. Then came the era of French classicism, represented by Corneille, Racine and Molière. Toward the end of the 18th century we have the period of German classicism, with Lessing, Schiller and Goethe. And within the last four decades we have witnessed the fifth great movement, which is the subject of the present article.

There is a big difference between the first four periods and the last, inasmuch as the former were all confined to particular nationalities, while the latter is cosmopolitan in character. The starting point of the modern movement is to be found in the works of Henrik Ibsen, the great Norwegian dramatist (1828–1906). Ibsen, indeed, may be considered the father of the modern drama. His works — among which may be mentioned 'Ghosts,' 'A Doll's House,' 'Rosmersholm' and 'The Wild Duck' — are characterized by the perfection of their technique, their realistic nature and the ideas or truths which they convey. His central idea is the insistence on true and unhampered expression of the individual's personality. Contemporaneous with him we find two other great Scandinavian dramatists, the Norwegian Björnson ('A Bankruptcy,' 'Beyond our Power,' etc.) and the Swedish Strindberg ('The Father,' 'Miss Julia,' 'Comrades,' etc.). The best works of these also belonged to the realistic category.

From Scandinavia the movement spread in every direction. Hardly a country in Europe, indeed, which has not at present its constellation of dramatic geniuses. In France, to mention but a few, there are Lavedan, Porto-Riche, Hervieu, Brieux and Rostand. In Germany and Austria there are Hauptmann, Sudermann, Wedekind, Schnitzler and Hofmannsthal. England has produced Wilde, Shaw, Barker and Galsworthy; Spain is represented by Echegaray and Galdos, Italy by D'Annunzio and Giacosa; Holland has Heijermans, Belgium Maeterlinck, Russia claims Tolstoi, Gorky, Tchekoff and Andreyeff.

There are two main currents or schools by which the modern drama is represented. The first and most important is the realistic, the other the romantic — or as it has been styled in contradistinction to a previous movement, the neo-romantic. The former is the characteristic product of the age — that which is due to the impetus of Ibsen, and to which most of the writers mentioned, besides many others who have not been mentioned, claim allegiance. The nature of the realistic drama is perfectly expressed by its name. It is a form of art which aims at a faithful depiction of life, without falsification or idealization. In former times this had not been the chief aim. Most previous dramas belonged to the categories known as classic or romantic. The subject matter in many cases was semi-mythical, as in the old

Greek and classic French drama. The characters, if they were real at all, were preferentially drawn from the ranks of the distinguished and high-born; unusual situations and plots were the rule; idealizations were common, and the exalted, unnatural character of the presentation was expressed by the prevailing poetry of the dialogue. All this is changed in the modern realistic drama. The characters which are brought to view belong to every rank of society, even the most humble. The plot loses its artificial character, and we are presented with a natural development of life itself, such as we can witness about us on every hand. Exact directions are given by the author as to the appearance of the actors and the setting of the stage, so as to produce an illusion of reality. And the language takes the form of prose, frequently imitating in its peculiarities of dialect and its exclamations and hesitations the exact form of speech of ordinary, everyday people. Barker's 'Madras House,' for example, shows us people moving about and conversing just as they do in real life. The same is true of the many scenes from society life in the dramas of the French, examples of which may be found in Lavedan's 'Le Prince d'Aurec' and Donnay's 'The Other Danger.' Hauptmann's 'Weavers' and Galsworthy's 'Strife' exhibit the scenes of misery, suffering and revolt which are connected with labor troubles, Gorky's 'Night Shelter' portrays the lowest and most painful aspects of Russian city life. There is little plot to the majority of these plays, just an unrolling of experience and a depiction of character.

It is impossible to go into a detailed exposition of the many excellent dramas that have appeared under the sway of naturalistic ideas. Suffice it merely to name a few of the more important, in addition to those already cited. We shall confine ourselves, in the case of every writer, to a single play. Porto-Riche is the author of 'Amoureuse,' Hervieu of 'La Course du Flambeau,' Becque has written 'Les Corbeaux,' Brieux 'Les Hannetons.' In German countries Hauptmann has given us 'Fuhrmann Henschel,' Sudermann 'Die Ehre,' Schnitzler 'Der einsame Weg,' Wedekind 'Frühling's Erwachen.' Tolstoi, in Russia, is the author of 'The Power of Darkness,' Giacosa in Italy of 'The Stronger.' In England we have Shaw with 'Man and Superman,' Galsworthy with 'Justice,' Barker with 'Waste.'

On this side of the ocean the naturalistic drama has not found embodiment in many works of superior literary value. In general, American plays do not make much pretense to literary worth, but are written solely for the stage. Many of the most effective are of a local and historic nature, and make telling use of picturesque, scenic and ethnographic backgrounds. Such are Bronson Howard's 'Shenandoah,' Herne's 'Shore Acres' and Moody's 'Great Divide.' Recently, however, there have been promising signs of a genuine literary awakening. And there has been a revival, following the example of England, of dramatic pageants. These are open-air performances, generally of a historic or symbolical nature, in which great numbers of people take part.

As already mentioned, the modern drama has been characterized by a return to romanticism, in addition to the development along naturalistic lines. The chief exponents of this movement have been Rostand in France, Maeterlinck in Belgium, Hauptmann in Germany, Hofmannsthal in Austria, Yeats, Synge and Lady Gregory in Ireland. Rostand is famous through his 'Cyrano de Bergerac,' likewise his 'Chantecler.' Maeterlinck has written, among other works, 'Pélléas et Mélisande' and 'The Blue Bird.' Hauptmann has given us 'Die versunkene Glocke' and 'Der arme Heinrich.' In part the movement in question has been due to the natural tendencies of the individuals who have furthered it, the romantic disposition being one which is always latent in human nature; in part it has had its source in a reaction against naturalism.

Like all great art movements, the realistic drama is an outgrowth of the age, and forms a faithful mirror of many of its constituent currents. Thus the scientific spirit finds a reflection in its exact observation and accurate description. There is an incident in Hauptmann's 'Einsame Menschen,' for example, which neatly illustrates the principle involved. Johannes Vockerat has just had a conversation with his wife and a friend, in which he has evinced considerable irritability. He leaves the room and steps out on the veranda, where he engages in calisthenic exercises. His wife and friend meanwhile continue the conversation, when suddenly the door opens and Johannes calls in: "Children, I was somewhat irritable. Be merry! I am so too." Though nothing to that effect is said either by the author or the personages of the play, it is evident that the change of feeling is due to the effect of the physical exercise.

The psychological trend of modern thought is also reflected in the realistic drama and comes to view in the mental and emotional nature of the conflicts portrayed. Of action there may be little — nothing but thought and emotion, expressed in words and gestures. The democratic conception of life is apparent in the treatment of the humblest aspects of existence, the prevailing interest in social questions in the nature of the problems that are considered. In general, the subject matter of the dramas is intensely modern. Except for the few scattered romantic plays, there is no looking backward to ages long gone by. Modern labor conditions, modern relations between husband and wife, modern demands for the emancipation of woman — these and many other subjects equally alive form the basis of dramatic treatment.

Along with this community of subject matter and treatment, however, there are national differences between the dramas that are equally pronounced. Thus, there is a strangeness of conduct on the part of the characters in Scandinavian plays that is typical. Ibsen's men and women are subject to morbidly exalted courses of action. Strindberg's people are swayed by the most peculiar reversals of feeling. The question is justified whether these extravagant manifestations may not be brought into relation with the unusual aspects of nature in Scandinavian countries. As Björnson says ('Beyond our Power'): "There is something in nature here which demands the unusual of us, also. Nature herself is beyond all reasonable limits. We have a night which lasts almost the whole winter. And our day lasts almost all summer. . . . Swarms of birds in millions; 'shoals of fish as long as from Paris to Strassburg' . . . mountains that rise sheer out of the sea. They don't resemble any other mountains. And the whole Atlantic breaks upon them." The question is also apropos whether all this is related likewise to the strangeness of harmony in the compositions of Grieg. In general there is a remarkable analogy between the literary productions of a country and its musical compositions.

This is evident when we come to the dramatic works of the Russians. If Scandinavian plays are eccentric, those of the Russians, like their music, are pitched in the minor key. The outlook upon life, as in Russian novels as well, is melancholy and pessimistic. Tolstoi's 'Power of Darkness' and Gorky's 'Night Shelter' show us humanity at its lowest depths, Andreyeff's 'Life of Man' concentrates into a single picture all the tragedy of existence. If we wish for a more specific analogy from the realm of music, we need but turn to the works of Tschaikowsky, and especially to his immortal Pathetic Symphony.

Spanish plays make constant use of the motif of honor, a fact which harmonizes with Spanish conceptions of life. And in Italy D'Annunzio reflects the passion for beauty which is inherent in the Italian race.

The Irishmen Wilde and Shaw exhibit a talent for brilliant wit and satire. Characteristic as this is likewise of their countryman Sheridan, it must be regarded as typical of the race. And as we meet with similar manifestations throughout the literature of France, it may be regarded as typical of the Celtic people as a whole.

Especially pronounced is the contrast between French and Teutonic dramas. In spite of their naturalism, the French still retain the agreeable exterior. Thoroughly discordant and repulsive aspects of life are rarely brought before us. The personages that are exhibited are mostly drawn from the well-to-do if not aristocratic circles of society. There is the glitter of wealth, education and social eminence. Likewise the conversation is characteristically lucid and polished. The subject matter of dramatic exposition is largely exhausted by the passion of love. Donnay confines himself entirely to this subject, Porto-Riche has collected his plays under the title of 'Théâtre d'Amour.' Furthermore, it is the illicit side of love that is preferentially dwelt upon. The characters in the plays are likely to be few, the number of plays of a particular playwright limited. The style is exquisite, the flow of dialogue smooth and connected. It is a drama that reminds us of the *salon:* polished, fastidious, well-arranged.

Far different in the north. Here it is as if we passed from the restraints of polite society into the boundless freedom of nature. There is a wider range of subject matter, a greater seriousness of interests. The plays are more numerous, the characters apt to be many, the words suggestive and replete with significance. Ibsen's 'Emperor and Galilean,' Hauptmann's 'Florian Geyer,' Galsworthy's 'Strife' are cast in large molds that are rarely found in the south. The subject of love, though by no means neglected, does not hold such exclusive sway. It is merely one of a great number of subjects. In general, there is a breadth and variety of material and interest that are thoroughly Shakesperean. Hauptmann, especially, illustrates this trait, as his works exhibit every shade of dramatic expression, from harrowing tragedy to light comedy, from crass realism to mystic romanticism. Likewise he is a wonderful portrayer of character. His men and women remind us of the realistic pictures of the old Dutch and German schools, with their sharply defined, expressive countenances. And there is a brooding, introspective tendency which is thoroughly German. In contrast we have the Viennese Schnitzler. If Hauptmann represents the sombre North German, Schnitzler stands for the mild, light-hearted Austrian. There is a delicacy and sweetness to his works that remind us of the tender strains of his countryman Mozart.

The realistic drama, like the music-drama of Richard Wagner, has been the subject of many controversies. Special theatres were at first required for its presentation (Théâtre Libre in Paris, Freie Bühne in Berlin), as the weight of tradition was strong against it, and many plays were prohibited by the censor. Even to-day there are voices that are raised against its excesses of naturalism. But whatever may be the verdict of posterity, whatever the direction which dramatic expression may take in the future, it has been an honest, inspired form of art, and has given voice to a demand of thought and feeling which was bound to find vent. In art, as in heaven, there are many mansions. There are countless ways of expressing beauty, and no one of these has an exclusive right to be considered legitimate. Furthermore, there is a temporal sequence of expressions which seems to be in accord with evolutionary laws. One form of beauty gives way to another with a sort of necessity, and the very fact that a school is in the ascendant to-day, far from being a reason why it should remain so to-morrow, is the strongest reason why it should yield. So naturalism came as a legitimate successor of previous forms of drama. It will doubtless be superseded by forms that are different. But it will not pass by without leaving its trace behind. As Guyau says, every new work of art changes the very conditions of beauty. So likewise with the works of the naturalistic school. They have added an element of truthfulness and seriousness which will never be entirely lost, but will have its influence on all the works that are to follow.

ALBERT GEHRING.

SCHOOLS OF DRAMATIC ART. See SCHOOLS OF DRAMA, MODERN.

SCHOOLS OF LIBRARY ECONOMY. See LIBRARY SCHOOLS.

SCHOOLS OF TECHNOLOGY. See TECHNOLOGY, SCHOOLS OF.

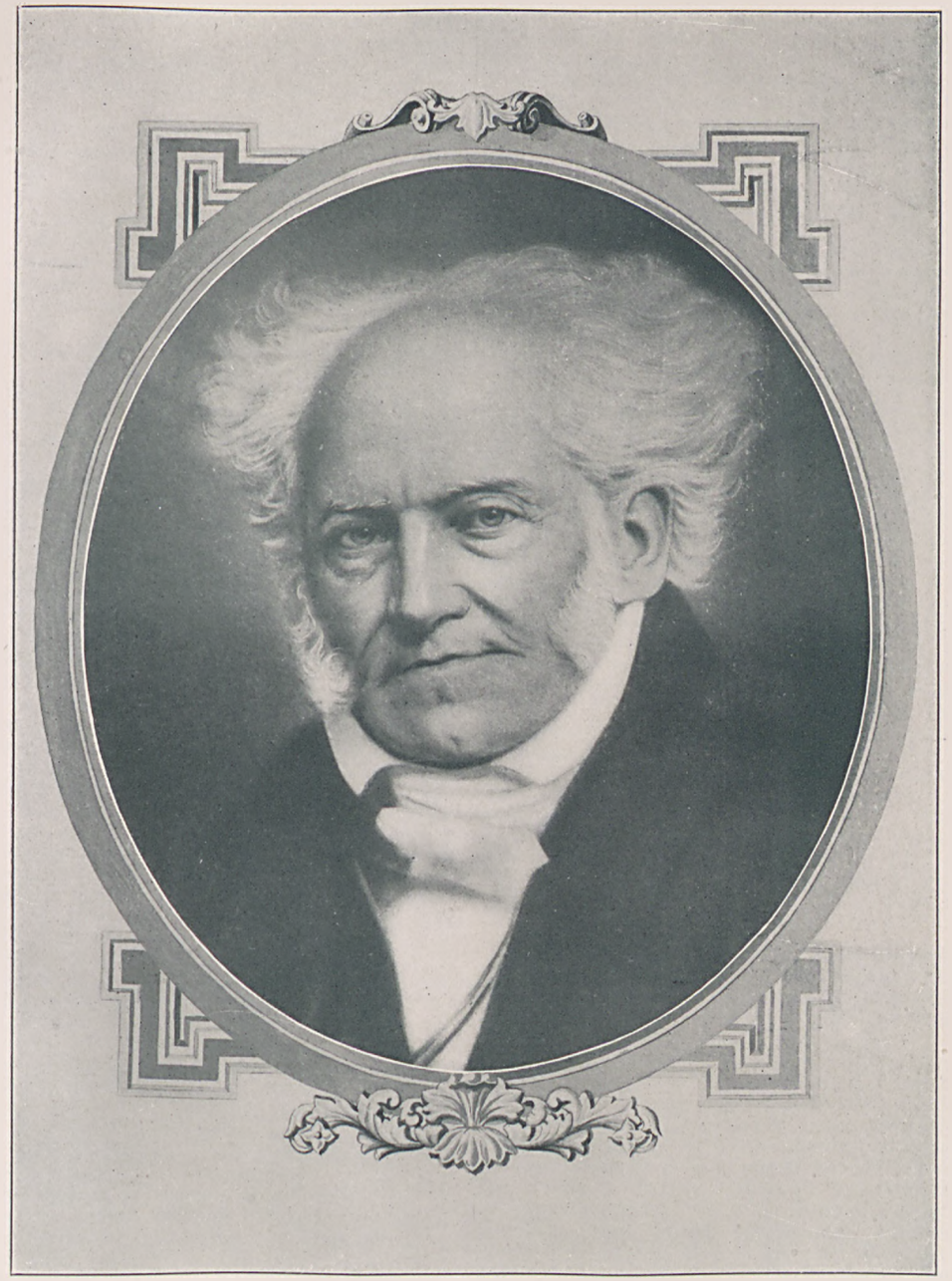
SCHOONER. See SAILING VESSELS; SHIPS, SAIL AND STEAM.

SCHOORL, shoorl, **SCHOREL,** or **SCOREL, Jan van,** Dutch painter: b. Schoorl, near Alkmaar, 1 Aug. 1495; d. Utrecht, 6 Dec. 1569. At 14 he was placed with the painter Willem Cornelis. Three years later he traveled to Amsterdam, and spent some years in the studio of Jakob Cornelis, one of the most celebrated painters and engravers on wood of that period. He next became a pupil of John of Mabuse, in Utrecht, and subsequently visited

many cities, including Cologne and Spires, where he studied architecture and perspective. He was received kindly by Dürer in Nuremberg. At 22 he passed through Carinthia to Venice, and thence to Palestine. For three years he remained within the walls of Jerusalem sketching views of the city and surrounding country. On his return he spent some time at Rhodes, and afterward at Rome, studying the works of Raphael, Michelangelo and Giulio, till Adrian VI, a native of Utrecht, ascended the papal chair in 1522, and committed to him the superintendence of the Belvedere. The death of Adrian the following year induced Schoorl to return home, which he did by way of France. He now executed many splendid pieces in Utrecht, afterward in Haarlem and from time to time in other cities in the Netherlands. He has been compared with Jan van Eyck, whom he equaled in splendor and truth of coloring, in expression, in warmth of representation; and, at the most, was inferior to him only in the execution of particular parts. Unhappily the rage of the fanatics in a subsequent age for destroying pictures was fatal to many of his most valuable works. Consult Toman, 'Studien über Jan van Scorel' (1889).

SCHOPENHAUER, shō'pĕn-how-ĕr, **Arthur**, German philosopher and man of letters: b. Dantzig, 22 Feb. 1788; d. Frankfort-on-the Main, 21 Sept. 1860. He was of Dutch ancestry on both sides. His father, Hendrick Schopenhauer, was a rich merchant, whose love of freedom was so great that he removed to Hamburg in 1793, when his native city, Dantzig, lost its independence and became a part of Prussia. Schopenhauer's mother, whose maiden name was Johanna Troisner, was a woman of artistic temperament and literary aspirations, some 20 years younger than her husband. After his death in 1805, she removed to Weimar, becoming a member of the literary coterie there, and gaining a reputation as a popular novelist. Heinrich Schopenhauer, proud of his position as an independent merchant, determined that his son should succeed him as the head of the business which he had established. With this object in view, he had him instructed in modern languages, especially in French and English, and took the boy with him on extensive trips through England, France, Holland and Germany, in order to give him a knowledge of the world. When Schopenhauer was 17 his father placed him in a business house in Hamburg. The work was distasteful to him and after his father's death, when he had vainly attempted to accommodate himself to a business career, he decided to follow his bent and devote himself to study. After receiving the necessary preliminary training at Gotha and Weimar, he entered the university at Göttingen in 1809, registering as a student in medicine. Later he studied in Berlin, where he heard lectures from Fichte and Schleiermacher, and finally received the degree of doctor of philosophy from the University of Jena in 1813, on submitting a thesis on "The Fourfold Root of the Principle of Sufficient Reason." After a residence of several years in Dresden, where he wrote his chief work, 'The World as Will and Idea' (Die Welt als Wille und Vorstellung, 1818), and a visit to Italy, he qualified as private lecturer (*Privat Docent*) in the University of Berlin. He came there with the most extravagant estimate of the importance of his own views, and with the greatest contempt for the prevailing idealistic philosophy, of which Hegel, then at the height of his popularity at Berlin, was the chief representative. Schopenhauer announced lectures at the same hour when Hegel's principal course was given. As a result, his audience was very small; and to make matters worse, his style of lecturing was not popular; his audience fell off and the lectures had to be discontinued before the end of the semester. This embittered him still more, and he imagined that he was the victim of a deliberate plot on the part of various "school philosophers" who had conspired to prevent his views from obtaining a hearing. He made a second visit to Italy, lasting almost three years, but returned to Berlin in 1825, residing here, until 1831, when the epidemic of cholera that carried off Hegel drove him to Frankfort. Here (with the exception of a short stay at Mannheim) he continued until his death. Toward the close of his life his philosophy began to attract popular attention, and Schopenhauer eagerly received the admiration and recognition of a circle of devoted disciples. His old age was the most happy and serene period of his life, though his estimate of his own work was so high that it was not possible to satisfy his demands for recognition and adulation.

Schopenhauer maintains that philosophy cannot be a science; that is, a body of truths derived through logical processes and open to anyone to learn with more or less trouble; but true philosophy is art, a revelation dependent on the intuitive insight of the man of genius. As in the case of a picture or musical composition, one will only perceive in a system of philosophy what one has the capacity to perceive. "There is no one philosophy," says Schopenhauer, "existing or acceptable for everybody. The difference in grades of intelligence is too great for that. The true philosophy, when it makes its appearance, will only command the attention of a few heads of the first order." To the circle of men of genius, then, Schopenhauer confidently claims to belong, and he expresses his contempt for the procedure of the savants who vainly seek philosophical truth by logical processes and accumulations of erudition. For Plato and Kant, Schopenhauer has the greatest admiration and his own thoughts are constantly connected with their ideas. In Plato what attracted him especially was the doctrine of an ideal world and its contrast with the unreality of the world of sensible phenomena. Kant maintained the same contrast and Schopenhauer always claims to be the true successor of Kant, although he replaces the latter's table of 12 categories with the single principle of "sufficient reason," which appears in a fourfold form. With regard to Kant's doctrine that we cannot know the true nature of reality, Schopenhauer also differs from his master. Science is, indeed, limited to the world of phenomena. But we can know the nature of reality by a more direct and intimate method than that which science pursues. In the immediate consciousness of myself I know myself as will; this is the side, the true reality of what appears objectively as body. After the analogy with ouselves everything is to be interpreted: in ourselves,



ARTHUR SCHOPENHAUER

we have the key that enables us to understand the world. The universe is in itself will. Like the individual, it has its phenomenal side, which can be known by the objective sciences. But its ultimate nature is will, blind, unconscious striving toward existence. The essence of each thing is found in its will. This essence manifests itself in various ways, and with varying degrees of consciousness, from the unconscious manifestations of inorganic forces like gravitation, to the conscious volitions of men.

Though the will is the ultimate source of reality, it creates for itself an external or phenomenal order. This is the order of the intellect, known in terms of the idea, and appearing as an external order of events in space and time which are connected by the principle of cause and effect. So far as the world of phenomena is concerned Schopenhauer is there in fundamental agreement with Kant. That is the realm of scientific knowledge of law and of intelligibility. But behind this as its source and centre is the reality of the irrational will.

The doctrine that the essence of all things is will, is the basis of Schopenhauer's Pessimism (q.v.), just as Hegel's view that reason is the ultimate ground of all things is the foundation of his optimism. Will, for Schopenhauer, is essentially and radically irrational. Under the concept of will he includes all desires, strivings and impulses, all tendencies to change. These, Schopenhauer declares, are all manifestations of dissatisfaction and pain. Our life itself is essentially painful. Pleasure is merely negative, being nothing but the relief arising from the temporary cessation of our pain and desires. Since the will, both in us and in nature, is irrational in its inmost nature, there is no hope of things becoming better. Pessimism necessarily results from insight into the ultimate nature of things. Schopenhauer dwells with extraordinary eloquence on the unspeakable misery of life and upon the aimless striving and irrationality that is everywhere manifested in the world process. But yet, in a way, this insight into the worthlessness of existence brings with it a means of escape. Relief is possible only when the will is stilled and the desires and appetites are silent. Such redemption one can attain in the contemplation of works of art or in listening to music. In this artistic enjoyment our wants cease to exist, the attitude of will is canceled. This relief, from its very nature, can only be transitory. Final redemption from the will must come through ethics. We must perceive that all willing is vain and pleasure unattainable, and also that since individual existence is untrue and only phenomenal, all individuals are at bottom identical in essence, that is, all are manifestations of the one world will. This is to some extent effected through sympathy. There is, however, a higher and more complete virtue than sympathy. It is found in the complete negation of the individual will, the denial of the will to live, based on insight into the nothingness of finite existence. Of this negation of the will we have examples in Christian and Oriental asceticism. This denial of the will is holiness and blessedness in one. It is from the point of view of knowledge Nirvana, nothingness, yet in it the soul finds its highest peace and truest reality.

Bibliography.— A complete edition of Schopenhauer's works, edited by Frauenstadt, appeared in 6 vols. (1873–74; 2d ed., 1877); by J. Giseback (1890); and by Steiner in 13 vols. (1894). His 'Fourfold Root of the Principle of Sufficient Reason' is translated by Hillebrand in the Bohn Library (1894), together with his essay, 'On the Will in Nature.' 'The World as Will and Idea' has been translated by Haldane and Kemp (3 vols., 1884–86). 'The Two Fundamental Problems of Ethics,' translation in Bohn Library by B. Bax; 'The Art of Controversy,' translated by Saunders (1896). Consult also Zimmer, 'Schopenhauer, His Life and Philosophy' (1876); Wallace, 'Life of Arthur Schopenhauer' (1896); Caldwell, 'Schopenhauer's System in Its Philosophical Significance' (1896); Fischer, Kuno, 'Arthur Schopenhauer' (1893); Sully, 'Pessimism' (2d ed., 1891); Ribot, 'La philosophie de Schopenhauer' (1874).

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SCHOULER, skoo'lẽr, **James,** American lawyer and historian: b. Arlington, Mass., 3 March 1839. He was graduated from Harvard in 1859, admitted to the bar in 1862 and built up a large practice which he was obliged to give up in 1870 because of deafness, caused by service in the Civil War. He then devoted himself to literature almost exclusively until 1884 when he engaged successfully as a lecturer. He has since been lecturer and professor at the Boston University Law School and at the National University Law School at Washington and in 1891 was appointed lecturer on constitutional law and history at Johns Hopkins. His publications include 'The Law of Domestic Relations' (1870); 'The Law of Bailments'; 'The Law of Personal Property'; 'The Law of Husband and Wife'; 'Eighty Years of Union' (1904); 'Executors and Administrators' (1883); 'Wills' (1887); 'History of the United States under the Constitution, 1783–1877' (7 vols., 1880–1913); 'Life of Thomas Jefferson' (1897); 'Alexander Hamilton' (1901); 'Americans of 1776' (1906); 'Ideals of the Republic' (1908).

SCHOUTEN, show'tẽn, **Willem Cornelis,** Dutch navigator: b. Hoorn, 1567; d. Madagascar, 1625. For several years previous to 1610 he was in the employ of the Dutch East India Company. He then determined to discover a new route to the Indies and with Isaac Lemaire of Hoorn began the formation of a company with 200,000 florins capital, Schouten's share being one-eight. He sailed in command of an expedition, 14 June 1615, was the first to round the cape which he called Cape Horn and crossed the Pacific to Batavia. Here he was arrested for infringement of the East India Company's privileges; but on his return was acquitted, while the company was fined. He discovered Schouten Island on the northern coast of New Guinea.

SCHRADER, shrā'dẽr, **Frederick Franklin,** American journalist and dramatist, son of an American citizen: b. Hamburg, Germany, 27 Oct. 1857. Author of plays, 'The Man from Texas,' 'The Modern Lady Godiva,' 'At the

French Ball,' 'Nicolette,' comic opera, music by Irenée Bergé, translated into Bohemian and produced in New York, 25 Dec. 1915; 'Corsica,' music drama in one act, music by Irenée Bergé, produced in 1910; lyrist of 'Baron Trenck,' produced in London 1911 and New York 1912. Translator of Max Nordau's, 'Freie Liebe' ('Paris Sketches'), and 'José,' novel, by Otto Ruppius. Assistant and Acting Secretary, Republican Congressional Committee, 1896–1900; author of Republican Text Book 1898. Dramatic editor Washington *Post* 1901–06; on literary staff, David Belasco 1906–09; dramatic editor New York *Globe*, 1909–10; editor New York *Dramatic Mirror* and president publishing company, 19 Aug. 1912 to 9 Sept. 1916. Co-founder with George S. Viereck of *The Fatherland*, August 1914, and for some time associate editor and now editor of *Issues and Events*.

SCHRADER, Julius, German painter: b. Berlin, 16 June 1815; d. Lichterfelde, 16 Feb. 1900. He studied at the Berlin Academy and at Düsseldorf under Schadow, 1837–45. Subsequently he traveled in Italy, England, Holland and Belgium and in the last country fell under the influence of the colorists Gallait and Biefoe. In 1851 he became professor at the Berlin Academy. Among his chief works are 'Surrender of Calais to Edward III' (1847); 'Frederick the Great after the Battle of Kolin' (1849); 'Death of Leonardo da Vinci' (1851); 'Milton and His Daughters' (1855); Cromwell at the Death-Bed of His Daughter' (1859). In fresco he painted 'First Twelve Christian Monarchs' in the Royal Chapel, and 'Consecration of the Church of Saint Sophia, Constantinople' in the New Museum, Berlin. Among his portraits are those of Humboldt and Ranke, the historian.

SCHREIBER, shrī'bĕr, **Sir Collingwood,** Canadian railway engineer: b. Essex, England, 14 Dec. 1831. He settled in Canada in 1852 and engaged in engineering practice at Toronto. He was assistant engineer of the Toronto and Hamilton Railway in 1852–56; superintending engineer of the Northern Railway in 1860–62; division engineer for the Nova Scotia government in 1863–67; and in 1867–73 he had charge of the surveys of the Intercolonial Railway and was chief engineer of the government railways in operation. He was appointed chief engineer of the Canadian Pacific in 1880; became chief engineer and Deputy Minister of the Department of Railways and Canals, Ottawa; and in 1905 he was appointed consulting engineer to the Canadian government and chief engineer of the western division of the National Trans-Continental Railway. He was knighted in 1916.

SCHREINER, shrīnĕr, **Olive** (better known by name of Olive Schreiner Cronwright), pseudonym "Ralph Iron," South African author: b. Basutoland, about 1860. In 1883 appeared «Ralph Iron's» first work, 'The Story of an African Farm,' a book of much interest with simple yet forceful pictures, from the Boer country. Further publications are 'Dreams' (5th ed., 1893); 'Dream Life and Real Life' (1893); 'Trooper Peter Halket of Mashonaland' (1897); and 'An English South African's View of the Situation' (1899); a critique on the Transvaal difficulty from the pro-Boer position. She was married in 1894 to S. C. Cronwright with whom she published 'The Political Situation' (1895).

SCHREINER, Oswald, American agricultural chemist: b. Nassau, Germany, 29 May 1875. He was graduated at the Baltimore Polytechnic Institute in 1892, the Maryland College of Pharmacy in 1894, and later studied at Johns Hopkins University and at the University of Wisconsin. He was United States Pharmacopœia Research Fellow in 1895–96, and in 1903 was appointed chemist of the United States Bureau of Soils. From 1906 he was chief of the Division of Soil Fertility Investigation; and in 1914 he was appointed consulting professor of chemistry at the American University. He has prepared many of the bulletins of his department and is also author of 'The Sesquiterpenes' (1904); 'Chemistry of Soil Organic Matter' (1910); 'The Nitrogenous Soil Constituents' (1913), etc.

SCHREYER, shrī'ĕr, **Adolf,** German artist: b. Frankfort-on-the-Main, 9 May 1828; d. Kronberg, Prussia, 29 July 1899. He studied at the Städel Institut, Frankfort, then at Stuttgart, Munich and Düsseldorf and supplemented this school instruction by wide travels in Europe and the East. In 1862 he became court-painter to the Grand Duke of Mecklenburg-Schwerin. He was a member of the academies of Antwerp and Rotterdam. Before 1870 he lived much at Paris; but after that year lived alternately there and at Kronberg. He was an animal painter, especially choosing the horse for his model and depicting it in vigorous action or, when held in rein, with pawing feet and distended nostril. He was, also, a follower of Fromentian in his love of Eastern subjects, particularly mounted Arabs dressed in brilliantly colored clothes, surrounded by a heated palpitating atmosphere. Some of his pictures are 'Artillery attacked by Prussian Hussars' (1854); 'Wallachian Transportation Train in Rainy Weather,' at Hamburg; 'Charge of Artillery of the Imperial Guard' (1865); 'Horses of the Irregular Cossacks' (1864) at Paris. His 'Battle near Waghensel, in 1849' (1858); 'Battle of Komorn,' 'An Attack of Cavalry,' and 'Prince Thurn and Taxis wounded at Temisvár' are among his best-known pictures, but are lodged in private galleries in Europe. Many canvases by Schreyer are to be found in the private collections of the United States, such as the Walters, the Vanderbilt, the Astor and the Huntington galleries. 'The Watering Place' is at the Corcoran Gallery at Washington.

SCHROEDER, shrē'dĕr, **Seaton,** American rear-admiral: b. Washington, D. C., 17 Aug. 1849. He was graduated at the United States Naval Academy in 1868, and accompanied Commodore Rodgers' expedition against the Korean forts in 1871. He was on special duty supervising the construction of the dynamite cruiser *Vesuvius* in 1888–90, and was in command of that ship in 1890–93. He was executive officer of the *Massachusetts* in 1897–99, and was advanced three points in rank for his services in the Spanish-American War. He was naval governor of the island of Guam and commander of the *Yosemite* in 1900–03; attained rank as rear-admiral in 1908, and was in charge of a division of the Atlantic fleet in 1908–09. From March 1909 until June 1911 he

was commander-in-chief of the Atlantic fleet. He then served on the General Board until 17 Aug. 1911, when he was retired upon reaching the age limit. He was retained on special service with the navy in 1911–14; and in 1917 was appointed hydrographer. Author of many essays and of 'Fall of Maximilian's Empire' (1887). Died Washington, D. C., 19 Oct. 1922.

SCHUBART, shoo'bärt, **Christian Friedrich Daniel,** German poet: b. Obersontheim, Swabia, 26 March 1739; d. Stuttgart, Germany, 10 Oct. 1791. He studied theology at Jena where he lived a dissipated life, and became musical director at Ludwigsburg in 1758, but was banished because of his dissolute conduct. After years of wandering he founded his *Deutsche Chronik* at Augsburg in 1774, but was driven thence in 1777 and removed his *Chronik* to Ulm. He there published a false report of the death of Maria Theresa and was imprisoned for 10 years when he was released at the demand of Frederick the Great in 1787. He then became musical and theatre director in Stuttgart and continued the publication of his paper under the title *Vaterlands-Chronik*. He wrote 'Gedichte aus dem Kerker' (1785); 'Hymnus auf Friedrich den Grossen' (1786), etc. His 'Gesammelte Schrifte und Schicksale' was published in eight volumes (1839–40). Consult Strauss, 'Schubart's Leben in seinen Briefen' (1849).

SCHUBERT, shoo'bĕrt, **Franz Peter,** Austrian composer: b. Vienna, 31 Jan. 1797; d. there, 19 Nov. 1828. His extraordinary musical gifts were displayed at a very early age, and his talents were so pronounced that his teachers had little else to do but kindle the ever-present though dormant spark.

Before he was 11 years old he was the leading soprano in the Lichtenthal choir, and he also played the violin solos in the services, besides composing songs and pieces for strings and piano. In his 12th year he entered the Imperial Convent, or school for educating choristers for the court chapel. His first piano composition, dated 8 April–1 May 1810, appears to have been a four-hand Fantasia, containing a dozen or more movements. While at the «Convent» he composed his first symphony, in D, in connection with the celebration of the birthday of Dr. Lang, the director of the school. His voice breaking, he returned home about the end of October 1812, in which year his mother died. He then joined his father in school work and for three years taught the primary class. Apart from his school duties he naturally devoted himself to composition, especially in the direction of setting words to music, to which he gave himself up with tremendous enthusiasm. His melodies seemed to be endless, his songs sprang into existence and poets could scarcely write down their verses before Schubert had them set to music. In the intervals snatched from his regular duties he found time to write eight operas, four masses and other sacred works, besides a great number of songs. In 1817 he was enabled to throw off the fetters of his school work through the generosity of his friend Schober. From this time till his death there was only one brief decade, but the number of his compositions during that time is stupendous. He composed with the greatest ease and rapidity, and it is said that he could readily keep up a conversation while writing even his best pieces. He never hesitated, and seldom revised anything he wrote. His compositions included more than 70 part songs, some 18 works for the stage, 8 sacred pieces, 20 string quartets, 10 symphonies, and 24 pianoforte sonatas, but after all it was not through these that Schubert's name was immortalized, but through his songs, the titles of nearly 500 of which are recorded. They were full of dramatic intensity, poetry and pathos, and full of music of infinite beauty set to long, complex poems, to which he arranged accompaniments of complete fitness and endless variety.

His engagement as teacher of music in the family of Count Esterhazy during the summer of 1818, at Zselész, was the source of his first regular income. There were two daughters in the Esterhazy family, Marie and Caroline, and a little boy of five. The congenial occupation of teaching them was renewed later, in 1824, at which time he composed his 'Grand Duo' (opus 140), full of individualism and truly a symphonic work in its fullest sense. During that summer he also composed his sonata in B flat, the variations in A flat, and a number of other pieces, presumably for use in the musical education of the Count's children.

To attempt to even mention any considerable number of Schubert's compositions here is manifestly impossible, but very complete lists of his works, arranged both alphabetically and also in the order of their composition, may be found in Grove's 'Dictionary of Music.'

One of Schubert's closest friends was Vogl, the tenor, through whose influence the attention of theatrical managers was attracted toward him. He had already written a comic operetta, the 'Zwillingsbrüder,' for the Kärntnerthor theatre, and not long after he was commissioned by a rival theatre to write the music for the 'Zauberharfe,' or 'Magic Harp,' which he is said to have completed in two weeks, and which was first performed on 19 Aug. 1820 in the Theater an-der-Wien. During this year, too, he wrote several of his best songs, including the famous 'Im Walde' or 'Waldesnacht.'

In the following February, when Schubert was entering his 25th year, his talents began to receive recognition, and the publication of his songs was at last within sight. The 'Erl King' was chosen first and was published (on commission) on 1 April 1821, enough money having been subscribed at one of the Gundelhof concerts to defray the cost of printing, engraving, and still leave something over for future publications. Seven more songs (constituting op. 3 and 4) were published on 29 May, op. 5 on 9 July, op. 6 on 23 August and op. 7 on 27 November. The next appeared on 9 May 1822, as «the property of the publishers,» who now stopped publication by commission, realizing that they could assume the responsibility without risk.

In August 1821 he began his symphony in E, which, although he did not complete the writing of it, is remarkable for the rapidity with which it was composed. It is said that he probably did not occupy himself with it for more than a few hours, and yet it filled 167 pages. A month or two later he wrote two acts of 'Alfonso and Estrella,' the words being

supplied by Schober. The third act was finished in February 1822, but no public performance of it was given until 26 years after Schubert's death, one cause of this delay being that the original accompaniments proved impossible for a band to play. During 1823 Schubert paid special attention to operatic music but without marked success, perhaps because the librettos were unsuitable. On this point Liszt regarded it as extraordinary that one who had been brought up to love the finest poetry should accept the absurd and impracticable librettos which were offered him, and which resulted in so much of his brilliant music being practically lost to the world. It was in this same year that his famous «Müller-lieder» were composed, consisting of musical settings to Wilhelm Müller's poems, a copy of which he had borrowed from his friend Randhartinger when visiting him.

The rejection of his opera 'Fierabras' in 1824 filled him with distress, from which however he was aroused by the quiet joys of his second stay with the family of Count Esterhazy at Zselész. During these happy days he probably wrote his lovely string quartet in A minor and the 'Divertissement à la Hongroise' for four hands, as well as several other pieces already mentioned.

Some of his best compositions in 1826 were the string quartet in D minor and G, the 'Rondeau brilliant,' as well as the sonata in G major, which Schumann regarded as his «most perfect work both in form and composition.» The number of pieces published in that year was very large, showing that a popular demand for his music had arisen, but nevertheless Schubert was always poor, partly because his profits were so small, and partly because he allowed himself to be imposed upon by his friends.

The year of 1827 was notable as the one in which Beethoven died. He and Schubert had not been intimate, and the latter's visit to Beethoven in 1822 had ended disastrously, for on looking over the 'Variations' Beethoven had pointed out something which astonished him, whereupon Schubert is said to have lost his self-control and to have rushed from the room. In April of this year was written the beautiful 'Nachtgesang im Walde' for four men's voices and four horns, and a spring song for men's voices. In this year he was elected a member of the Musical Society of Vienna, which gave him considerable satisfaction.

The last year of Schubert's life, 1828, was remarkable for the number of his compositions, among which, writes Grove, were «his greatest known symphony (in C), his greatest and longest Mass, his first Oratorio, his finest piece of chamber music, three noble pianoforte sonatas, and some astonishingly fine songs.» On 26 March he gave his first evening concert in the hall of the Musik-Verein. The program was very attractive and the applause great. In the month before he died he wrote a new 'Benedictus' to one of his Masses, wind-accompaniments to his 'Hymn to the Holy Ghost,' a long scena for a soprano voice, and a song entitled 'Die Taubenpost,' which is thought to have been his last composition. He was buried, in accordance with his dying wishes, in the Ortsfriedhof in the village of Währing, and in a grave only separated by two others from the one which held the remains of Beethoven.

Schubert's most prominent characteristics were truthfulness, honesty, good-humor and a cheerful, contented disposition. With his intimates he was entirely at ease, genial and even boisterous at times, but at a fashionable gathering he was shy and silent. Of his musical genius no better description can be given than in the words of Liszt: "He was the most poetical musician that ever was; and the main characteristics of his music will always be its vivid personality, fullness and poetry. In the case of other great composers, the mechanical skill and ingenuity, the very ease and absence of effort with which many of their effects are produced, or their pieces constructed, is a great element in the pleasure produced by their music. Not so with Schubert. In listening to him one is never betrayed into exclaiming 'how clever'; but very often, 'how poetical, how beautiful. how intensely Schubert.'" Consult Ferris, 'The Great German Composers' (1878); Kreissle von Hellborn, 'Franz Schubert, eine biographische Skizze' (1861–65; Eng. trans. 1869); Reissmann, 'Franz Schubert, sein Leben und seine verse' (1873); Barbedette, 'Franz Schubert, Sa vie, ses œuvres, son temps' (1866); Frost, 'Schubert' (1888).

SCHUCHERT, shŭk'ĕrt, **Charles,** American palæontologist: b. Cincinnati, Ohio, 3 July 1858. He received a common school education, but possessing a natural aptitude for scientific investigation he early began a collection of fossils and the study of palæontology. He was assistant to different experts in 1885–91; and in 1891–92 assisted in the geological survey of Minnesota. He was preparator of fossils with Dr. C. E. Beecher at Yale in 1892–93; served on the United States Geological Survey in 1893–94; and since 1904 he has been professor of palæontology and Yale professor of the history of geology at Sheffield Scientific School, and curator of the geological collections at Peabody Institute. Author of 'Textbook of Geology'; 'Historical Geological Paleograph of North America'; 'Revision of Paleozoic Stelleroida, with Special Reference to North American Asteroida' (1915), etc.

SCHULMAN, shool'man, **Samuel,** American rabbi: b. Russia, 14 Feb. 1864. He came to America as a child, was graduated at the College of the City of New York in 1885 and studied at the University of Berlin in 1885–89. He was rabbi at Helena, Mont., in 1890–93; at Kansas City, Mo., in 1893–99; and since 1899 has been rabbi of Temple Beth-El, New York. He was a member of the board of editors for the English translation of the Bible for the Synagogue; a contributor to the 'Jewish Encyclopedia'; and is author of articles on religious topics.

SCHULTZ, shůlts, Sir **John Christian,** Canadian administrator: b. Amherstburg, Ontario, 1 Jan. 1840; d. Winnipeg, 13 April 1896. He was educated at Oberlin College, Ohio; Queen's University, Kingston; and at Victoria University, Cobourg, taking his M.D. in 1860. He then engaged in practice at Winnipeg (then Fort Garry), also becoming interested in the fur trade and editing the *Nor'wester*, the first newspaper of the region. He led the Canadian party at the time of the first Riel Rebellion, 1869–70, was taken prisoner and sentenced to death by Riel. He made his escape, however, and in 1872 became a member of the North West Council. He was a member of the Dominion Parliament in 1871–82; and was a Dominion senator in 1883–88. He was lieutenant-governor of Manitoba in 1888–95. He was actively interested in railway and telegraph development and in colonization; and was for many years a member of the Dominion board of health for Manitoba and the North West Territory. He was knighted in 1895.

SCHULTZE, shoolt sĕ, **Carl Emil,** American newspaper artist: b. Lexington, Ky., 25 May 1866. He was educated at Lexington and at Cassel, Germany, began drawing for newspapers and under the name of «Bunny» created the popular «Foxy Grandpa» series of comic pictures published since January 1900 in two New York journals. Since 1913 he has been president of the Bunny Amusement Corporation of New York. He is the author of 'Vaudevilles and Other Things' (1900); 'The Adventures of Foxy Grandpa' (1900); 'The Bunny Book' (3 vols.), etc.

SCHULZ, shoolts, **Leo,** American musician: b. Posen, Germany, 28 March 1865. He was educated at Posen, and in the Royal Academic High School of Music in Berlin, came to the United States in 1889, was professor of the New England Conservatory until 1898, was connected with the New York Philharmonic Society in 1890–1906. He published ''Cello Album,' ''Cello Classics' and ''Cello Compositions' (two books each), and author of many unpublished 'cello compositions, songs, orchestral overtures, cantatas, etc.

SCHULZE-DELITZSCH, shoolt'sĕ-dā'-lĭch, **Hermann,** German politician and economist: b. Delitzsch, Prussian Saxony, 29 Aug. 1808; d. Potsdam, 29 April 1883. After legal courses at Leipzig and Halle, he entered the Prussian public service; but from 1841 devoted his attention to the economic betterment of small farmers and artisans. Among his various activities, the most important was the establishment of the "people's bank" system, inaugurated at Delitzsch. In these banks, the subscribers made small deposits, obtaining proportional credit and dividends; the management being vested in a board composed of subscribers. In 1859 the more than 200 such banks were centrally organized under the direction of Schulze-Delitzsch. At the time of his death there were in Germany alone 3,500 branches with more than $100,000,000 in deposits; while the system had been extended to Austria, Italy, Belgium and Russia. He published 'Chapters of a German Workingman's Catechism' (1863); 'The Laboring Classes and Associationism in Germany' (2d ed., 1863); 'Money Advance and Credit Associations as People's Banks' (5th ed., 1876). Consult his life by Bernstein (1879).

SCHUMANN, shoo'măn, **Clara Josephine Wieck,** German pianist, wife of Robert Schumann: b. Leipzig, 13 Sept. 1819; d. Frankfort-on-Main, 20 May 1896. She was the daughter of the pianist Frederick Wieck, from whom she received instruction for 15 years and for the first time took part in a public concert in her ninth year. When Paganini appeared at Leipzig in 1829 he produced a profound impression upon her and her musical genius was developed still further by a tour with her father through the musical centres of Germany and France. While she derived her marvelous technique from her father, she was well grounded in the theory of music by Kupsch and H. Dorn. She was the first to bring Chopin's works into notice and favor with the German public. In 1840 she was married to Robert Schumann (q.v.) and shared his artistic work and European successes until his death in 1856, after which she pursued her public career alone. In 1878 she was appointed teacher in the Conservatory of Frankfort-on-Main, where she met with success in that capacity, and continued to turn out a series of brilliant pupils until 1892. She was equally gifted as a performer, teacher and composer, and among her works at least 40 are in print and comprises songs, a concerto for the piano, a trio for the piano, preludes and fugues. Consult La Mara, 'Musikalische Studienköpfe' (Vol. V); Kohut, 'Friedrich Wieck'; Von Meichsner, 'Fredrich Wieck und seine beiden Töchter.'

SCHUMANN, Robert, German composer: b. Zwickau, Saxony, 8 June 1810; d. Endenich, near Bonn, 29 July 1856. His father, who was a bookseller and an author of some note, while not directly assisting him toward a musical career, encouraged him, and endeavored to obtain the services of Von Weber as his instructor. After his father's death, when Robert was 16, he attended the gymnasium at Zwickau, and later the University of Leipzig. At 17 he set a number of his own pieces to music. His academic work had been largely confined to law and philosophy, but at 20 he began serious piano study under Wieck and Heinrich Dorn. An unwisely chosen method, intended to secure independent action of his fingers, resulted in the crippling of one of the fingers of his right hand, which unfitted him for becoming a pianoplayer, and thenceforward he devoted himself to composing. In 1834 he assisted in founding, and until 1844 edited, a musical journal, the *Neue Zeitschrift für Musik*, for advancing the art and emancipating it from old-fashioned methods and from French and Italian influences. Convinced that German art had not yet reached its full development, he thus expressed himself: «Consciously or unconsciously a new and as yet undeveloped school is being founded on the basis of the Beethoven-Schubert romanticism, a school which we may venture to expect will mark a special epoch in the history of art.»

In 1833 Schumann occupied himself with studies in composition, and also published his first 'Impromptus' (op. 5). In this year, too, he commenced his 'F minor Sonata' (op. 11), and completed the toccata which he had commenced in 1829. A turning-point was reached in his life in October 1835 when Mendelssohn and he met at a musical gathering at Wieck's. A strong intimacy seems to have grown up between them. Schumann declared that Mendelssohn was the greatest living musician and that he looked to him as a «high mountain-peak.» Mendelssohn at first saw in Schumann only the literary man and the art critic, but it is significant that when, in 1843, Mendelssohn established the Leipzig Conservatorium, Schu-

mann was appointed teacher of playing from score. While there he introduced the use of the piano with pedals as a preparation for playing the organ.

Schumann's marriage in 1840 to Clara Wieck, daughter of his old teacher, was apparently a very happy one, and the fact that he soon afterward began to compose love songs does not weaken this belief. At the same time his wife regarded it as her greatest privilege to interpret his compositions faithfully to the public, nor was it long before she became the leading woman pianist of Germany. In the year after his marriage he paid more special attention to symphonic work, composing three entire numbers, only one of which, however — in B♭ — was published at that time. He also wrote the first movement of the 'Pianoforte Concerto in A minor.' In 1842 Schumann accompanied his wife on a concert tour to Hamburg. The latter proceeded alone from there to Copenhagen, while he returned to Leipzig. Later they visited Bohemia and met Prince Metternich, at whose invitation they went to Vienna. In 1844 they traveled to Russia, Madame Schumann giving concerts in several of the large cities; but Schumann, who loved the quiet of domestic life, was always impatient to return home.

The style of Schumann's compositions underwent a decided change in 1843, the principal work of the year being 'Paradise and the Peri,' for solo voices, chorus and orchestra. It was first performed on 4 December, and was conducted by Schumann in person. He also composed his popular 'Variations' for two pianos (op. 46), and from this time his reputation in Germany was firmly established. Thus encouraged he began in the following year the second of his two most famous choral works consisting of a musical setting to Goethe's 'Faust.' About this time he gave up the editorship of his paper and changed his residence to Dresden, where he at first lived in seclusion on account of his nervous condition, resulting doubtless from overwork. In 1845–46 he composed his 'Studies' and 'Sketches' for the pedal-piano, as well as his famous 'C major Symphony,' first produced by Mendelssohn at the Gewandhaus in Leipzig, 5 Nov. 1846. In Dresden he met Richard Wagner, for whose work he expressed great admiration, but on account of their very different natures they were never in close sympathy. The former was high-spirited and talkative, while Schumann, always reserved, was growing more and more silent. The idea of the improvement of German operatic music, long a favorite subject with Schumann, now led him to write an opera. He chose as his subject the legend of Saint Geneviève, but only after long and irritating delays was the first performance of 'Genoveva' arranged. This took place on 25 June 1850 under Schumann's own direction. The criticisms of this first attempt at dramatic work were on the whole unfavorable, and it is said that he derived far more gratification from the reception accorded to his music of 'Faust.' He also wrote an excellent musical setting for Byron's 'Manfred,' which had its first performance in Weimar 13 June 1852.

While living in Dresden he undertook the direction of the Liedertafel, and in 1848 he established a choral society. Two years later he accepted the position of municipal director of music at Düsseldorf. Here he had the direction of a vocal organization and an orchestra. His duties were sufficiently light, however, to leave him ample time for social enjoyment, in which he took great pleasure. His generous nature was manifested by his arrangement of a series of concerts, some of which were devoted wholly to the works of other living composers. This was in line with his desire to aid in advancing the interests of those less famous than himself. As a conductor Schumann was not regarded as a success. His lack of presence of mind and of sympathy with the players was conspicuous and contributed largely to his unpopularity as a leader. This unfortunate condition of things, combined with the return of a brain affection, symptoms of which had been first manifested as far back as 1833, at length made it necessary for him to resign his post, which he did in 1853. During his residence in Düsseldorf the number of his compositions was very great, including the celebrated 'E♭ Symphony,' which, it is believed, was intended to convey by musical expression the impressions he received during a visit to Cologne. It was first performed on 6 Feb. 1851, almost exactly three years before that sad day when, in a state of utter mental distraction, he sought to end his life by jumping into the Rhine. He was saved by some boatmen, but unmistakable signs of insanity soon appeared, although for a brief period later his mind became wonderfully calm and clear, and with it returned his old love of work. His mental powers were shattered, however, and the last two years of his life were spent in an asylum at Endenich. He was buried at Bonn. A monument over his grave was unveiled on 2 May 1880.

Schumann's works present a rare combination of passion and tenderness. He did much for the development of piano-playing and his numerous songs reveal the grandeur and depth of his unselfish nature. His compositions consist of orchestral works, vocal works with orchestral accompaniment, choruses, a large number of songs, chamber music and also many pieces for the organ and piano. Striking features of Schumann as a composer are his originality and his cautious approach to the more difficult classes of work. At the outset of his career he chose simple forms, building several together for his longer pieces. From this method, however, resulted no unevenness or inharmoniousness, a fact which bears strong witness to the greatness of his creative abilities. In the composition of songs Schumann must be conceded to take rank with such composers as Schubert and Mendelssohn. As one of his biographers writes: "Schubert shows the greatest wealth of melody, Mendelssohn the most perfect roundness of form; but Schumann is by far the most profoundly and intellectually suggestive."

Until Schumann reached his 30th year he wrote almost entirely for the piano, and his method of treating the instrument must be regarded as strictly original. He followed none of the methods of the older composers, although he was evidently familiar with their work. His earlier compositions strike the hearer as the result of sudden impulses and, therefore, contain much that is apparently at variance with the established laws of art, but this in no wise detracts from, but rather adds to, the freshness and originality of their conception.

His symphonies are generally regarded as the most important contributions of this class since the time of Beethoven, whom he approached quite nearly at times, and whose works occasionally served as his models. His love for sacred music was developed only a few years before his death. In writing to a friend in 1851 he said: "It must always be the artist's highest aim to apply his powers to sacred music. But in youth we are firmly rooted to the earth by all our joys and sorrows; it is only with advancing age that the branches stretch higher, and so I hope that the period of my higher efforts is no longer distant." Several compositions of this class are recorded, one of the most famous being op. 71, an Advent hymn for solo, chorus and orchestra; op. 93, a motet for men's voices; op. 144, a New Year's hymn for chorus and orchestra; his 'Mass,' op. 147, and a 'Requiem,' op. 148. These, while not counted among his greatest works, were grandly conceived, and with his other compositions must be a lasting monument to his imperishable genius.

A list of Schumann's works may be found in the catalogue of Schuberth and Company (1860–61), while a complete index to all his published compositions was compiled by Alfred Dörffel and was printed as a supplement to the 'Musikalisches Wochenblatt' (Leipzig 1875).

R. I. Geare,
National Museum, Washington, D. C.

SCHUMANN-HEINK, hĭnk, **Ernestine,** née **Roessler,** American opera and concert singer: b. Lieben, near Prague, Bohemia, 15 June 1864. She was educated at an Ursuline convent and studied music under Marietta Leclair at Gratz. She made her debut at Dresden, 13 Oct. 1878, and sang in opera there for four years, afterward singing for many years at Hamburg and Bayreuth, winning a wide reputation for her magnificent contralto voice and splendid acting. She made her London début at Covent Garden, 8 June 1892, repeating her former triumphs, and first appeared before an American audience at the Metropolitan Opera House, New York, in 1898. Since 1908 she has been engaged chiefly in concert work, although she has made occasional appearances at the Metropolitan Opera House and with the Chicago Grand Opera Company. She ranks as the leading contralto of her time. She was thrice married, to Herr Heink in 1883; to Paul Schumann in 1893, and to William Rapp, Jr., in 1905, divorcing him in 1915. She is an American citizen and has for some years made her home in America. During the European War she gave freely of her time and talent in war benefits and the great loan campaigns.

SCHURMAN, shoor'măn, **Jacob Gould,** American educator: b. Freetown, Prince Edward Island, 22 May 1854. He is of a Dutch family which in the 17th century settled in New Holland, now New York, where his grandfather was born. He was educated in the provinces where he gained the Gilchrist Dominion Scholarship in 1875 and studied later at London and Edinburgh universities. He was elected to the Hibbert traveling fellowship in 1878 and spent two years at Heidelberg, Berlin and Göttingen, mainly occupied with the study of philosophy. In 1880 he became professor of philosophy and English literature at Acadia College, Nova Scotia, and in 1882 removed to a similar post at Dalhousie College. In 1886 he became professor of philosophy at Cornell University and in 1890 was made dean of the Sage School of Philosophy there. In 1892 he was elected president and resigned in 1920. He was appointed by President McKinley chairman of the United States Philippine Commission in 1899 and spent the larger part of that year in the Philippine Islands. During the year 1912–13 he was United States Minister to Greece and Montenegro. He was appointed Minister to China in June 1921. He wrote 'Kantian Ethics and the Ethics of Evolution' (1881); 'The Ethical Import of Darwinism' (1888); 'Belief in God' (1890); 'Agnosticism and Religion' (1896); 'A Generation of Cornell' (1898); 'Philippine Affairs — A Retrospect and Outlook' (1902). He is also joint author of the 'Report of the Philippine Commission' rendered to Congress in 1900; 'Why America is in the War' (1917).

SCHURZ, shoorts, **Carl,** German-American publicist, editor and author: b. Liblar, near Cologne, Prussia, 2 March 1829; d. New York City, 14 May 1906. He studied at the University of Bonn, in 1848 with others published a revolutionary journal, in 1849 escaped to the Palatinate upon the failure of an insurrection which he promoted at Bonn, took part in the defense of Rastadt and upon its surrender fled to Switzerland. In 1850 he returned to Germany, going thence to Scotland and to Paris, where he was a correspondent for the German press, and, after a year in London, came to the United States (1852), where until 1855 he resided in Philadelphia. Having then removed to Madison, Wis., he identified himself with the Republican party, and by his speeches made himself an important factor in determining the German element of the State against slavery. He participated in the Lincoln-Douglas senatorial canvass in Illinois, entered legal practice at Milwaukee, was a member of the National Republican Convention of 1860 and assisted largely in the framing of its platform. During the ensuing campaign he spoke much in both German and English. He was appointed by Lincoln Minister to Spain, but in December 1861 resigned to enter the army, receiving a commission as brigadier-general of volunteers. He distinguished himself at the second Bull Run (Manassas), was promoted major-general, 14 March 1863, commanded a division at Chancellorsville, held temporary command of the 11th corps at Gettysburg and took part at Chattanooga. After the war he returned to professional practice, in 1865–66 was Washington correspondent of the New York *Tribune,* and was made by President Johnson a special commissioner to report on the workings of the Freedmen's Bureau. In 1868 he was temporary chairman of the convention that nominated Grant, whom he actively supported in campaign. In 1869–75 he was senator from Missouri. He vigorously opposed many of the leading measures of the Grant administration, in 1872 helped to organize the "Liberal" party and presided over the Cincinnati convention which nominated Greeley, but in 1876 supported Hayes, by whom he was made Secretary of the Interior. He introduced competitive examinations for posts

in the civil service, and provided for forest protection on public domains. From the close of the administration to 1884 he was editor of the New York *Evening Post*. In the canvasses of 1884, 1888 and 1892 he supported Cleveland. He had been prominently identified with the Civil Service Reform League and later with the Anti-Imperialist League. His speeches and contributions to periodicals were numerous and able. Among his many publications are a volume of 'Speeches' (1861), a 'Life of Clay' (1887), and 'Abraham Lincoln: An Essay' (1891). A statute of him has been erected on Morningside Drive at 116th street, New York City.

SCHUVALOFF, shoo'vä-lŏf, **Peter Andreievitch,** COUNT, Russian diplomat: b. Saint Petersburg, Russia, 15 July 1827; d. there, 22 March 1889. He early entered the army, rose to the rank of general at 30, was head of a department in the Ministry of the Interior in 1862, governor of the Baltic provinces in 1864–66, and in the latter year was appointed chief of the secret service. He was sent to London in 1873 as Special Ambassador and arranged the marriage between the daughter of Alexander II and the Duke of Edinburgh. In 1878 he was a representative at the Congress of Berlin, where his pacific course cost him his popularity and influence at home, and later as Ambassador to England he was instrumental in preserving friendly relations between Great Britain and Russia after the Russo-Turkish War of 1877–78, but Prince Gartschakoff was displeased with his concessions and recalled him from London, and thereafter he took no part in public affairs.

SCHUYLER, skī'lẽr, **Aaron,** American educator: b. Seneca County, N. Y., 7 Feb. 1828; d. Salina, Kan., 1 Feb. 1913. He was educated at Seneca Academy, Ohio, and was its principal, 1851–62. He was professor of mathematic's at Baldwin University, Ohio, 1862–75, and president 1875–85, and from 1885 till his death he was professor of mathematics and mental philosophy at Kansas Wesleyan University, Salina. He was author of 'Complete Algebra' (1870; rev. ed., 1883); 'Elements of Geometry' (1876); 'Higher Arithmetic' (1877); 'Empirical and Rational Psychology' (1882); 'Outlines of Psychology' (1893); 'Systems of Ethics' (1902), etc.

SCHUYLER, Eugene, American diplomat: b. Ithaca, N. Y., 26 Feb. 1840; d. Cairo, Egypt, 18 July 1890. He was graduated at Yale in 1859 and at Columbia Law School in 1863. After practising law he entered the diplomatic service in 1866, was consul at Moscow and Reval and secretary of legation at Saint Petersburg, 1870–76. In 1876 he was transferred to Constantinople and that year, after careful investigations, rendered an important report on the Turkish massacres in Bulgaria. In 1878 he was consul at Birmingham; the next year consul-general at Rome and in 1880 became chargé d'affaires and consul-general at Bucharest. In 1881 the United States government authorized him to arrange and sign the commercial and consular treaties with Rumania and Serbia and in the following year he assumed toward those two countries and Greece the post of Minister-resident and consul-general. In 1889 he became consul-general at Cairo. He published 'Peter the Great Emperor of Russia' (1884); 'Turkestan: Notes of a Journey in Russian Turkestan, Khokand, Bokhara and Kuldja' (1876); 'American Diplomacy and the Furtherance of Commerce' (1886). He also made translations from Tolstoi and Turgenieff.

SCHUYLER, Louisa Lee, American social worker, great-granddaughter of Gen. Philip Schuyler and of Alexander Hamilton: b. about 1838. She was a member of the United States Sanitary Commission in the Civil War; was one of the organizers and for many years an officer of the New York State Charities Aid Association, founded in 1873; in 1874 originated the first American training school for nurses at Bellevue Hospital against the protest of a considerable share of the management, which grudgingly allotted six wards for its practice field; and in 1907 she was appointed a trustee of the Russell Sage Foundation. She received in 1915 an honorary LL.D. from Columbia University in recognition of her more than 50 years of public service. Author of numerous reports and papers.

SCHUYLER, Montgomery, American journalist: b. Ithaca, N. Y., 19 Aug. 1843; d. New Rochelle, N. Y., 16 July 1914. He was educated at Hobart College, served in the Union army in 1862–63, was on the staff of the New York *World* in 1865–83, New York *Times* in 1883–1907 and New York *Sun* from 1912 till his death. He published 'The Brooklyn Bridge' with W. C. Conant (1883); 'Studies in American Architecture' (1892); 'Westward the Course of Empire' (1906).

SCHUYLER, Philip John, American soldier: b. Albany, N. Y., 20 Nov. 1733; d. there, 18 Nov. 1804. He was the second son of John Schuyler, owner of a large estate near Albany. He served in the French and Indian War in two campaigns (1755–58), first as captain and afterward as commissary with the rank of major. In 1761 he went to England to settle the colonial claims. Returning in 1763 he successfully engaged in the lumber business at Saratoga. He built the first flax mill in America. In 1764 he acted as a boundary commissioner to determine the line between New York and Massachusetts, and later helped settle the New Hampshire boundary. In 1768 he was chosen as Albany's representative in the colonial assembly, where he earnestly defended the side of the colonists. In 1775 he was a delegate to the Continental Congress and served on the committee to frame rules and regulations for the Continental army. He was appointed (19 June 1775) major-general and placed in command of the department of northern New York, with headquarters at Albany. He planned to invade Canada and proceeded as far as Lake Champlain, where he left Gen. Richard Montgomery in command of Fort Ticonderoga, while he returned to Albany to raise more troops and forward supplies. Early in 1776 he led an expedition to Johnstown, N. Y., where he captured the military stores of the British. Owing to a clash with Gen. Horatio Gates he offered his resignation (14 Sept. 1776), which Congress would not accept. In 1777 he was appointed chief of the Pennsylvania militia, and in June was again placed in command in northern New York. On 4 July 1777 Ticonderoga was evacuated by Gen. Arthur Saint Clair, and later General Schuyler was tried by court-martial for alleged neglect of duty in permitting its capture. He was acquitted and completely vindicated. On 29 July 1777, he evacuated Fort Edward and retreated down the Mohawk Valley before Burgoyne. Notwithstanding the patriot success at Bennington (16 August), he was superseded by Gates (19 August), yet he remained with the army and to him belongs credit of effecting Burgoyne's surrender (19 October). He was again a delegate to the Continental Congress (1778–81) and his counsels were often sought by Washington. As president of the board of Indian commissioners he visited the tribes of the Six Nations and made treaties that secured their neutrality. He was a member of the New York senate (1780–84, 1786–90 and 1792–97) and actively promoted the building of a canal between the Hudson and Lake Erie. He was United States senator from New York (1789–91 and 1797–98). He resigned because of ill-health. He was married (17 Sept. 1755) to Catharine Van Rensselaer and had 11 children. His daughter Elizabeth became the wife of Alexander Hamilton. Consult Lossing, 'Life and Times of Philip Schuyler' (1860–62; 2d ed., 1872–73); Tuckerman, 'Life of General Philip Schuyler' (1904)

SCHUYLERVILLE, skī'lẽr-vĭl, N. Y., village, Saratoga County, on the Hudson River, and on the Fitchburg Railroad, about 10 miles east of Saratoga Springs, and 35 miles north of Albany. It was named in honor of Philip Schuyler (q.v.) who planned the campaign against Burgoyne. The village is in an agricultural region, and has a number of industries connected with farm and dairy products. It is a favorite summer resort; and many tourists visit the village on account of its historical associations. A tablet on one of the business blocks gives the information that near is the place where Burgoyne surrendered to Gates. A half mile up the slope from the main street stands the Saratoga Battle monument, erected by the Saratoga Battle Monument Association. The corner stone was laid on the 100th anniversary of the Burgoyne surrender, 17 Oct. 1877. It is ornamented on each side of its four fronts by niches, three of them containing bronze statues of Generals Schuyler, Gates and Morgan. The south niche, where would have been placed the statue of Benedict Arnold, stands empty. All roads from Schuylerville seem to lead to battlefields whereon were fought and won the independence of the republic.

SCHUYLKILL, skool'kĭl (from the Dutch, meaning "hidden channel"), a river in Pennsylvania, which has its rise in Schuylkill County, flows southeast and enters the Delaware River at Philadelphia. The total length is about 125 miles. In 1816–25 the river was made navigable for freight boats to Port Carbon, three miles above Pottsville (q.v.). Philadelphia obtains from the Schuylkill a large part of the city water supply. The river furnishes considerable water power which is used for manufacturing at Pottsville, Reading, Norristown and other places on its banks, and also at Philadelphia.

SCHUYLKILL HAVEN, Pa., borough in Schuylkill County, on the river of the same name, 25 miles northwest of Reading, on the Pennsylvania, the Philadelphia and Reading and the Lehigh Valley railroads. It is situated in a coal mining region, and is an important coal-shipping point, having a coal storage yard of a million tons' capacity. There are rolling mills, railroad car shops, pipe mills and manufactures of underwear, hosiery, shoes, soap, paper boxes and flour. Pop. (1920) 5,437.

SCHWAB, shwäb, **Charles M.,** American financier: b. Williamsburg, Pa., 18 April 1862. He was educated at Saint Francis College, Loretta, Pa., entered the service of the Carnegie Company as a stake driver in the engineering corps of the Edgar Thompson Steel Works, and became chief engineer and assistant manager in 1881. He was superintendent of the Homestead Steel Works in 1887–89; president of the Carnegie Steel Company in 1897–1901; and president of the United Steel Corporation in 1901–03. He is chairman of the board of the Bethlehem Steel Company and of the Bethlehem Steel Corporation, and director in many trust and manufacturing companies. He was appointed director-general of shipbuilding of the United States Shipping Board Emergency Fleet Corporation, 28 April 1918, and earned high approbation for the energy and ability with which he handled its affairs.

SCHWAB, John Christopher, American political economist: b. New York, 1 April 1865; d. New Haven, Conn., 12 Jan. 1916. He was graduated from Yale in 1886 and later studied at the universities of Berlin and Göttingen. He was instructor, assistant professor and professor of political economy at Yale in 1890–1905, editor of the Yale *Review* from 1892 and librarian from 1905. He published 'History of New York Property Tax' (1890); 'The Confederate States of America' (1901), etc.

SCHWANN, shvän, **Theodor,** originator of the cell theory: b. Neuss, 7 Dec. 1810; d. Cologne, 14 Jan. 1882. He was educated in philosophy and medicine at Bonn, Wurzberg and Berlin. From 1834 to 1839 he was the assistant of Johannes Muller (q.v.). While occupying this position he discovered pepsin (q.v.), and published numerous important researches on artificial digestion, on the transmission of nerve-impulses, on the law of muscular contraction, on the walls of the capillaries, on decomposition and fermentation, on procreation, etc. In 1838 Schwann became professor of anatomy at Louvain, and in 1848 at Liège. In 1858 he was also appointed to the chair of physiology. His 'Mikroskopische untersuchungen uber die Ubereinstimmung in der Struktur und dem Wachstum der Tiere und der Pflanzen' (Berlin 1839) marks an epoch in biology. Here he points out that both animals and plants are made up of elementary units, the cells (q.v.). This book was translated into English in 1847 by Henry Smith under the title, 'Microscopical Researches into the Accordance of the Structure and Growth of Animals and Plants.' Schwann also wrote the article 'Anatomie du corps humain' in the 'Encyclopedia populaire' (Brussels 1855).

SCHWANTHALER, shvän'tä"lẽr, **Ludwig von,** German sculptor: b. Munich, 26 Aug. 1802; d. there, 28 Nov. 1848. He attended the Art Academy at Munich, and was a pupil of the battle painter Albrecht Adam; but in 1821

took up his father's profession of sculpture and at once received a commission from King Maximilian to furnish a model for a silver épergne decorated with incidents from the fable of Prometheus. After a year's travel in Italy (1827) he executed the figures for the Ægina Gallery of the Glyptothek at Munich, and other decorative work for the same building. His 'Shakespeare' in the vestibule of the theatre in his native city belongs to this period, as does the Bacchus frieze in the ballroom in the palace of Duke Max. On being appointed professor in the Art Academy at Munich he soon gathered a great number of pupils about him. He was meanwhile busy in numerous important works; a frieze illustrating the 'Voyage of the Argonauts'; a statue, 'Poetry of Hesiod'; the reliefs illustrative of Pindar; the statues of Æschylus, Sophocles and Aristophanes; the reliefs illustrating the myth of Aphrodite. Of his monumental work in marble and bronze, are the pediment groups in the Walhalla, consisting of 15 statues illustrating the 'Victory of Arminius over Varus'; and the two pediment groups for the Munich propylæum. The greatest, however, of his works of this class is the figure of 'Bavaria,' more than 20 feet in height, for the Hall of Fame in Munich. He also executed many statues of notable individuals. Among his ideal works are the life-size figures in sandstone of 'Venus'; 'Diana'; 'Vesta and Ceres'; 'Apollo'; 'Eros'; 'Bacchus'; and 'Pan.' This series was completed in 1840 for the castle of Wiesbaden. His 'Dancing Girl,' a life-size figure in white marble is a work of remarkable beauty. His 'Shield of Hercules,' begun at Rome, is conceived in the pure classic spirit. It illustrates, after Hesiod, that divinity's exploits, etc., in 140 figures; has been cast in bronze, and replicas are to be found both in Germany and England. He was a sculptor of the Romantic school and his works did much to promote the cause of Romanticism, an art cause which lost much by his death. While several of his works exhibit great spontaneity, sometimes he overelaborates to such a degree as to impair the force of his original conception.

SCHWARTZ, shvärts, **Christian Friedrich,** German Protestant missionary: b. Sonnenburg, Prussia, 26 Oct. 1726; d. Tanjore, India, 13 Feb. 1798. He was educated at the University of Halle, 1746–49, ordained at Copenhagen and sailed from London for India 1750. He was stationed at Tranquebar, a Danish mission, until 1766, when, having transferred himself to the English Society for Promoting Christian Knowledge, he removed to Trichinopoly and founded a church and a school. He removed to Tanjore, in 1778, and went as an ambassador to negotiate peace with Hyder Ali, at Seringapatam, in which he was successful after all others had failed. In a later war he succeeded in saving the city of Tanjore from famine by his influence with the peasants, whom he induced to send supplies. He gained the friendship of the rajah of Tanjore and of Hyder Ali, and the former, on his deathbed, entrusted his son and successor to the missionary's care. A monument designed by Flaxman and erected at Tanjore commemorates the young rajah's gratitude for his tutor, while another at Madras testifies to the general appreciation of the services of Schwartz in India. Consult Pearson, 'Memoirs of the Life and Correspondence of C. F. Schwartz' (1833).

SCHWARTZITE, a mercury-copper ore worked in Sumber district, Baker County, Ore.

SCHWARZ, Berthold, a Franciscan friar of Freiburg or Dordmund: d. Venice, 1384. His real name was Constantin Anklitzen: Berthold was his monastic name, and the epithet Schwartz, "black," was added to it, because of his addiction to the study of chemistry, in the course of which he is supposed to have discovered an explosive, formed by the combination of saltpetre, sulphur and quicksilver; or of saltpetre, sulphur, lead and oil. Thus he is sometimes credited with the invention of gunpowder. This is said to have taken place in the early part of the 14th century. Schwarz, whether the inventor of gunpowder or not, was undoubtedly the inventor of artillery. In 1380 he came to Venice, and was commissioned by the government to cast some cannons, which are described as of an enormous size. The price agreed upon for his work not being forthcoming he became importunate, and was rewarded by being cast into prison, where he died. In 1853 a statue was erected to him in Freiburg. Consult Hansjakob, 'Der schwarze Berthold. der Erfinder des Schiesspulvers' (1891). See GUNPOWDER.

SCHWARZENBERG, shvärt'sĕn-bĕrg, **Adam of,** Franconian count: b. 1587; d. Spandau, Prussia, 17 March 1641. He was descended from one of the oldest families of Franconia, was Prime Minister to George-Wilhelm, the Elector of Brandenburg, was all-powerful during the Thirty Years' War, and caused great calamities to the electorate of Brandenburg through his promoting an alliance with Austria against the Swedish Protestant League. When the «Great Elector» assumed the reins of government in 1640 he punished Schwarzenberg by divesting him of his power and imprisoning him in the fortress of Spandau, where he died.

SCHWARZENBERG, Karl Phillip of, Franconian prince and soldier: b. Vienna, Austria, 15 April 1771; d. Leipzig, Germany, 15 Oct. 1820. He received a military training and served with distinction in the battles of Wagram, Hohenlinden and Ulm, and after the Peace of Vienna 1809, was Austrian Ambassador to Paris, where he is said to have arranged the marriage between Maria Louisa and Napoleon. At Napoleon's request he was created a field-marshal and, in 1813, placed at the head of the Austrian army of observation in Bohemia. When Austria joined Russia and Prussia, Prince Schwarzenberg commanded the allied forces, gained the battle of Leipzig and led the victorious armies into Paris 1813. Consult Prokesch-Oesten, 'Denkwürdigkeiten aus dem Leben des Feldmarshalls Fürsten Schwarzenberg' (1882).

SCHWATKA, shwät'ka, **Frederick,** American Arctic explorer: b. Galena, Ill., 29 Sept. 1849; d. Portland, Ore., 2 Nov. 1892. He was graduated at West Point in 1871, served as second lieutenant, United States army, until 1878, when he obtained leave of absence, and headed an expedition to King William's Land, in search of records and remains of Sir John Franklin's Arctic exploring party. He was successful and brought back in 1880 some valuable geographical information as well as the buried records, then having made a sledge journey of 3,251 miles, the longest on record. Schwatka next explored the Yukon River in Alaska, and returning in 1884, resigned his army commission, having meantime been promoted to first lieutenant. He led three other exploring expeditions: one to Mount Saint Elias, which he ascended for 7,200 feet, for the New York *Times* in 1886; one in 1891 to Alaska, opening up some 700 miles of new territory; one in 1889 to Chihuahua in Mexico, for the journal *America.* He was the recipient of the Roquette Arctic medal from the Paris Geographical Society, of a medal from the Imperial Geographical Society of Russia and of honors from geographical societies of Rome, Berlin and Geneva. He was the author of 'Along Alaska's Great River' (1885); 'Nimrod in the North' (1885); 'The Children of the Cold' (1886). Consult Gilder's 'Schwatka's Search' (1881).

SCHWEINFURTH, shvīn'foort, **Georg August,** German explorer and botanist: b. Riga, 29 Dec. 1836. He was educated at Heidelberg, Munich and Berlin, specializing in botany, and in 1863–66 explored the valley of the Nile and the African Coast of the Red Sea; in 1869–71, aided by the Royal Academy of Sciences of Berlin, he explored equatorial Africa in the countries of the Bongo, Madi, Dinka and other peoples, and discovered a tribe of pigmies and the river Welle. He founded the Egyptian Geographical Society 1872, and in 1880 became the director of all the Egyptian collections in Cairo. In other explorations he investigated the oasis of El-Chargeh; the botany of various districts of Egypt; the southern portion of Arabia, and Hélouan and the Italian colony of Erythrea. His publications chiefly relate to travel and botany, and include 'Plantæ quædam Niloticæ' (1862); 'Beitrag zur Flora Æthiopieus' (1867); 'Reliquiæ Kotschyaræ' (1868); 'Im Herzen von Afrika' (1874); 'Artes Africanæ' (1875), etc.

SCHWEINITZ, shvī'nĭts, **Edmund Alexander, de,** American bishop of the Unity of the Brethren Church, son of L. D. von Schweinitz (q.v.): b. Bethlehem, Pa., 20 March 1825; d. South Bethlehem, Pa., 18 Dec. 1887. He was graduated at the Moravian Theological Seminary at Bethlehem in 1844, and studied at Berlin in 1845. He held various pastorates in 1850–80, and in 1870 was consecrated bishop. His family for more than 100 years was continuously represented in the American branch of the Moravian ministry. He was president of the Theological Seminary at Bethlehem in 1867–84. In 1856 he founded the *Moravian* and edited it in 1856–66. Author of 'Moravian Manual' (1859); 'The Moravian Episcopate' (1865); 'Some of the Fathers of the Moravian Church' (1881); 'History of the Unitas Fratrum' (1885), etc.

SCHWEINITZ, Emil Alexander de, American bacteriologist: b. Salem, N. C., 18 Jan. 1866; d. Washington, D. C., 15 Feb. 1904. He was graduated from the University of North Carolina in 1882, subsequently studying at Göttingen and taking a medical degree at Columbian University, Washington. He was dean and professor at the Columbian Medical School and director of the biochemic laboratory of the Department of Agriculture at Washington, and made many original investigations in regard to bacteria, tuberculosis, disinfectants and hygienic problems. The results of these investigations appeared in numerous published scientific papers.

SCHWEINITZ, George Edmund de, American opthalmologist, son of Edmund A. de Schweinitz (q.v.): b. Philadelphia, Pa., 26 Oct. 1858. He was graduated at the Moravian College in 1876 and took his M.D. at the University of Pennsylvania in 1881. He was professor of opthalmology at the University of Pennsylvania from 1902; and was consulting opthalmologist at the Philadelphia Hospital and consultant at the Philadelphia Polyclinic. He was for many years first lieutenant in the United States army medical reserve corps and was promoted major in 1917. He was coeditor of the 'Opthalmic Year Book' (1905–09), and author of 'Diseases of the Ear' (8th ed., 1916); 'Toxic Amblyopias' (1896); 'Diseases of the Eye, Ear, Nose and Throat' (1899), etc.

SCHWEINITZ, Louis David von, American Moravian clergyman and botanist: b. Bethlehem, Pa., 13 Feb. 1770; d. there, 8 Feb. 1834. He was educated in Germany, entered the Moravian ministry and in 1812 returned to America as the general agent of the Moravian Church in the United States. He afterward filled other important offices in the Church both at Salem, N. C., and at Bethlehem. He was an enthusiastic botanist and added 1,400 new specimens to the catalogue of American flora. He devoted himself particularly to the study of American fungi, which had hitherto received scant attention. At his death he possessed the largest private collection of plants in America, and this he willed to the Philadelphia Academy of Natural Science. Author of 'Conspectus Fungorum Carolinæ' (1818); 'Synopsis Fungorum in America Boreali Media Degentium' (1832), etc.

SCHWEINITZ, Rudolf, German sculptor: b. Charlottenburg, 15 Jan. 1839; d. Berlin, 8 Jan. 1896. He was a pupil of the Berlin Academy and of Schievelbein, took a prominent part in the decoration of the National Gallery at Berlin and executed numerous commissions for monuments, public works and official buildings. Among his works were many busts, such as those of Crown Prince Frederick William (1872) and William I (1882) in marble. The memorial of William I and Frederick III at Fürstenwalde is also by him, as are also 20 decorative statues for the equestrian memorial of Frederick William III at Cologne.

SCHWENKFELD, shvĕnk'fĕlt, **Kaspar von,** German mystic and religious leader: b. Ossig, Silesia, 1490; d. Ulm, 10 Dec. 1561. He studied at Cologne and other universities, in 1516 entered the service of the Duke of Liegnitz, and was made a councillor. A learned scholar, he differed from Luther on several points of theology, and was thus opposed by both Catholics and Protestants. His writings are of interest in the study of the times of the Reformation. Those who adhered to his views were subjected to greater or less persecution and in 1734 many emigrated to Pennsylvania,

where they settled in Montgomery and adjacent counties. There they maintain a few small churches, the doctrines, disciples and government of which in many particulars resemble those of the Society of Friends. The Schwenkfelders or Schwenkfeldians have sometimes been erroneously identified with the Dunkards. Consult Kadelbach, 'Ausführliche Geschichte Kasper von Schwenkfelds und der Schwenkfelder in Schlesien, der Ober-Lausitz und Amerika' (1861).

SCHWENKFELDIANS, shvĕnk'fĕl-dĭ-ănz. See RELIGIOUS SECTS.

SCHWERIN, shvā-rēn, Germany, capital of the Free State of Mecklenburg-Schwerin, picturesquely situated on the west shore of the Lake of Schwerin, 20 miles south of the Baltic, and 130 miles northwest of Berlin. The lake is 14 miles long and 3 broad, and has smaller lakes behind it. The town is surrounded with handsome suburbs and contains the grand castle (1845–58), a Renaissance structure, erected by Wallenstein on a small island, one of the finest Gothic cathedrals in northern Germany, begun in 1248 and completed in the 15th century, with interesting monuments and stained glass; an arsenal; a museum and picture-gallery, and manufactures lacquered wares, machinery, cloth, tobacco, beer, etc. Pop. about 43,131.

SCHWIND, shvĭnt, **Moritz von,** Austrian painter: b. Vienna, 21 Jan. 1804; d. Munich, 8 Feb. 1871. He was a pupil of the Vienna and Munich academies, and in 1832–34 decorated a room in the Königsbau with encaustic pictures; in 1834–35 he undertook one of his greatest works, the painting of 60 compositions in water-color for Castle Hohenschwangau; became a professor in the Munich Academy in 1847; in 1854–55 painted the frescoes in Wartburg, and in 1864–67 those in the Vienna Opera House. He was a member of the Berlin, Vienna, Paris and other academies, and was knighted in 1855. He is considered one of the foremost of modern painters and the best representative of German romanticism. He worked as well in fresco, oils or water-colors, and his compositions number several hundreds.

SCHWYZ, shvĭts, Switzerland, capital of the canton of Schwyz, on the Gotthard Railroad, three miles northeast of the Lake of Lucerne. The interesting old town-hall contains the earliest trophies of the Swiss struggles for independence. There are also a handsome church and several higher educational institutions. The chief industries are cotton-spinning and the manufacture of bricks. Fruit and cattle-raising are extensively carried on in the neighborhood. Pop. about 9,000. Schwyz took such a conspicuous and leading part in the revolts against the house of Hapsburg that its name was applied to the whole of the Swiss Confederacy.

SCIACCA, shäk'kä, Italy, a seaport town and bishop's see in Sicily, in the province of Girgenti, 30 miles northwest of Girgenti on a sloping hill. It is badly built; its principal buildings are the cathedral (11th century), some ancient castles, several convents and a technical school and gymnasium. It is the Sicilian headquarters of Mediterranean coral fishing. There are manufactures of bricks, pottery, barrels, baskets, olive oil and many persons are employed in fish-curing. Pop. about 27,000.

SCIÆNIDÆ, sī-ĕn'ĭ-dē, a family of percomorphous, spiny-rayed teleostomous fishes, somewhat resembling perches, in which the body is usually slightly compressed and elongated and covered with thin, slightly ctenoid scales. The head is scaly and its superficial bones are remarkable for the extensive development in them of passages for the mucous canals. The premaxillary bones are protractile and the chin is provided with pores and sometimes a barbel. Jaw teeth are well developed but, beyond the formation of enlarged canines, are not differentiated, but large molar teeth may pave the pharyngeal bones. The fins are well developed, the soft dorsal long, the caudal usually rounded or truncate and the anal short and preceded by one or two spines, never more. With few exceptions the air-bladder is large and of complicated structure; and it is by forcing air through this organ that the peculiar grunting and rumbling sounds produced by these fishes are caused. Most of the species are marine and littoral, but a few are fresh-water. Most of them feed upon other fishes but some upon crustaceans and mollusks. The family is an extensive one of 30 genera and about 150 species widely distributed and especially numerous in warm seas, and most of them are good food-fishes, two species, the *Maigre* and the *Bearde dumbrina,* being particular favorites for the table. Nearly all of the genera and more than 100 species are recorded as occurring in North American waters, including some food-fishes of first-rate importance and several game-fish. There may be mentioned as belonging here the weakfishes, drums, croakers, kingfish, spot and yellowtail.

SCIATICA, sī-ăt'ĭ-ka, a painful neuritis of the sciatic nerve, which is the chief nerve of the back of the thigh and leg. It is characterized by extreme pain, often excruciating and occurring in paroxysms, and increased by any change of temperature and moisture; there is stiffness and generally swelling of the limb at the beginning of the disease, but after repeated attacks the limb seems to shrink, owing to the wasting of the muscles. In some cases the articulation of the hip seems affected, and permanent immobility of the limb takes place. Mild attacks are often called neuralgia of the sciatic. In all cases very careful examination of the pelvis and the bones of the lower part of the spinal column should be made, and all causes for chronic poisoning sought for. It is a very chronic condition. See NEURALGIA; NEURITIS.

SCIDMORE, skĭd'mōr, **Eliza Ruhamah,** American traveler and author: b. Madison, Wis., 14 Oct. 1856. She became identified with the National Geographic Society at Washington, D. C., in 1890, and later its corresponding and foreign secretary. Her published works include 'Alaska: The Southern Coast and the Sitkan Archipelago' (1885); 'Jinrikisha Days in Japan' (1890); 'Guide to Alaska and the Northwest Coast (1890); 'Westward to the Far East'; 'From East to West'; 'Java: the Garden of the East' (1897); 'China, the Long-Lived Empire' (1900); 'Winter India' (1903); 'As The Hague Ordains' (1907), etc.

SCIENCE OF LANGUAGE. See LANGUAGE, SCIENCE OF.

SCIENCES, Classification of. The effort to classify systematically the manifoldness of scientific achievements is a part of the methodology of science, and thus ultimately a part of logic. It has attracted the philosophical thinkers from the days of Plato to the present time. It came to the foreground of logical thought especially at those epochs in which new scientific movements started. It was thus mostly much more than a mere dividing and subdividing of the already existing sciences. It was essentially an endeavor to open new perspectives and to show the way to new possibilities of development. The new ordering and grouping of the parts of knowledge was thus always a symptom of great philosophical movements and an expression of deepest energies in productive ages. Only those periods whose scientific thought was lost in specialization without originality neglected the logical task of working out a survey of the whole field.

The principles of classification have changed frequently, and it would be almost artificial to seek a direct continuity in the successive efforts. Essentially psychological are those classifications with which both the classical philosophy and the modern philosophy answer the problem for the first time, inasmuch as both Plato and Bacon group human knowledge in relation to mental faculties. When the Platonists divided all knowledge into dialectics, physics and ethics, the three large parts corresponded to the activity of the reason, to the sensory perception and, thirdly, the desires and impulses. Bacon, also, comes to a three-fold division of human learning, corresponding again to three mental regions. It is memory, imagination and reason which are responsible for the subdivision of the "intellectual globe." The memory gives us history; imagination gives us poetry; and reason furnishes us with philosophy or the sciences. History is divided into Natural History, with its subdivisions of Normal, Abnormal and Artificial Phenomena; and Civil History, with its subdivisions of Political, Literary and Ecclesiastical History. Poetry is to be divided into Parabolic, Dramatic and Narrative. Philosophy, or the sciences, finally refer first to Man, secondly, to Nature, thirdly, to God. The Science of Man is subdivided into Civil Philosophy, with its departments of Intercourse, Business and Government; and on the other side, Philosophy of Humanity, which refers either to the Body, with Medicine, Athletics, etc., or to the Soul with Logic and Ethics. The Science of Nature is Speculative, and as such either Physics or Metaphysics; or it is Applied, and as such either Mechanics or Magic.

This classification of Bacon remained a classic model for more than a century. The French Encyclopædists still stood completely under his influence, and d'Alembert substituted only art in general for poetry, thus continuing the intellectualistic attitude, according to which poetry and art are defined as technical means of communication and expression and thus as parts of the system of knowledge. Yet the onesidedness of every psychological classification was always felt, especially because there is no knowledge which originates from one group of mental functions only. It thus seemed a natural antithesis to refer the sciences not to their mental origin but to the mental purposes which are to be fulfilled by them. It can be said that such a reference to purpose controls the classification of Aristotle. He combines the Dialectics and Physics of the Platonists into the one group of Sciences with theoretical purpose. A second group is then formed by the Sciences which refer to practical ends of action. And the third group, finally, are the Sciences related to creative activity. The Theoretical Sciences are divided into Analytic, Metaphysics and Physics; the Practical Sciences into Ethics and Politics; the Creative Sciences into Art and Technics. In a similar way, Locke, too, adjusts the divisions of knowledge to three groups of purposes. The first end of Knowledge is a theoretical understanding; the second purpose is the good and the useful; and the third is the development of Science in the interest of the understanding. He comes thus to the separation of Physics, Ethics and Logic, defining Logic as a nominalistic science.

The progress of natural science, with its important efforts of classification in descriptive botany and zoology suggested in the meantime more and more a classification of all knowledge with reference to the various groups of objects. Of course, in the subdivision such grouping with reference to the various things in the universe had always been acknowledged; but complete systems of classification of this type were now worked out from various sides. Both the physicist Ampère and sociologist Bentham, for instance, start thus from the difference of physical and mental phenomena, the one dividing all sciences into Cosmology and Noology, the other into Somatology and Pneumatology. Their further classifications elaborate a complex system in which partly theoretical, partly practical, principles are influential. Their fundamental division corresponds in a certain way to the two large classes with which in our present time the unphilosophical efforts of popular science are usually satisfied. Popular sciences prefer, indeed, to-day mostly to group all knowledge with reference to the material and, accordingly, to work with a classification which begins with a separation of physical and mental facts. The physical facts are then subdivided with reference to the different classes of objects and the mental facts of the individual and of society with regard to the different groups of mental interests.

Yet the classification with reference to mental faculties, practical purposes or groups of material are not the only ones which have become influential in the development of thought. Even a naturalistic age could not overlook the fact that, after all, the different sciences do not really deal with different objects, but more often with different aspects of the same object. Man himself, for instance, can play a rôle in a large variety of sciences which do not belong together at all. These various aspects which interest the different sciences are, however, not simply co-ordinated; otherwise they would be unfit to constitute a systematic order. Comte recognized that they were dependent upon each other, and thus he created a system in which the fundamental sciences were conceived in one straight line of logical order. If each member of the series really demands the foregoing as its presupposition, it is a necessary

consequence to see with Comte in this logical order at the same time the historical order of the sciences. The latest and most complex group of knowledge is that which he called Sociology, which contains practically all the knowledge of history and civilization, all the mental and moral facts as far as they enter into a system of positive knowledge at all. But this whole social life presupposes the understanding of man as an organism. The science of sociology is thus dependent upon the science of biology. But the biologist, again, tries to bring back his facts to the laws of chemistry, which he presupposes, and so forth. The one-dimensional system of Comte thus begins logically with a most general type, with mathematics, and goes from that to astronomy, from that to physics, then to chemistry, then to biology and finally to sociology. Spencer's system is essentially an elaboration of Comte's. He, too, begins with the most abstract science, mathematics; progress is then to the abstract concrete sciences which deal with the general forces of the universe, mechanics, physics and chemistry for which mathematics is the presupposition, and thence to the concrete sciences which refer to single objects; that is, to astronomy, geology and biology, while psychology and sociology become special parts of biology. The shortcomings of all these efforts are evident as soon as we consider that such positivistic systems crowd the totality of mental and moral sciences and all that refers to history and civilization under the conception of sociology. That means, of course, a strictly naturalistic aspect of the history of culture. All that the inner civilization of mankind has produced, politics and law, literature and art, knowledge and religion and philosophy, become then nothing but functions of the biological organism; and yet everyone who takes the standpoint of the historian or jurist, of the philosopher or theologian, feels the artificiality of such a naturalistic standpoint for these disciplines. The principle of grouping the sciences with reference to their logical relation is, however, in itself, of course, not responsible for this artificiality and for this unfairness to the historical and cultural disciplines. It was the materialistic metaphysics of those positivistic systems which brought about this overweight of natural science. On idealistic ground the reference to logical relations yielded accordingly a system of very different type. In Hegel's philosophical system, for instance, the sciences are brought, too, into logical relations with fullest justice to the demands of the moral sciences.

But while the Hegelian system has lost its influence in our day through its speculative character, our time is, in its deeper thought, strongly influenced by a newer movement which again brings order into the intellectual globe by insisting on logical differences which had been neglected too long a time. This movement, starting with Windelband, considers as the more essential difference between the various special sciences whether the logical aim is to find laws or to understand the individual objects. When Spencer separates those more abstract sciences of the physical and chemical energies from the sciences of the concrete individual object, it is a matter of course for him that these sciences of individual objects have to overcome the concrete individuality and have to find general laws which hold for all the concrete objects of that special group. This newer school, on the other hand, insists that there are sciences which on principle do not want to find laws and are not interested in generalities, but seek to understand and to interpret the concrete objects just in their individuality. All the historical sciences then belong to this group as against the natural sciences which seek the abstract laws. It is evident that this division has again nothing to do with the separation of the different kinds of objects, as any kind of material may be considered from both standpoints. Any process may be on the one side considered as a special case of a general law, interesting thus only in so far as it allows the recognition of any law in it, and, on the other hand, it may be considered in its incommensurable individuality. As a matter of course from such a logical standpoint mental life, too, allows both ways of consideration, and enters thus on the one side, into the law-seeking naturalistic sciences, on the other side, into the historical sciences which seek the unique individuality. Psychology would be the natural science of the mental phenomena.

It can be said that these various motives which have alternated in the classification of science are all still influential to-day, partly as after effects of historical movements like those of Comte and Spencer or Fichte and Hegel, partly as results of conditions which ever again repeat themselves. Especially the different emphasis on different sciences must lead always anew to different methods of grouping. The philosopher, the physicist, the historian, the psychologist insist instinctively on different schemes of classification, the one perhaps influenced by the manifoldness of material, the other by the manifoldness of method or by the variety of purpose; the one anxious to draw sharp demarcation lines between the different fields and thus taking care for an exact logical relation, the other much more anxious to express and to favor in his system the manifoldness of interrelation between the various parts of human knowledge and science. It is thus hardly possible to sketch a classification of sciences which would find general agreement and which would be in principle independent of a particular philosophical standpoint. Yet it may be possible to characterize at least certain chief tendencies which can be recognized in the scientific life of our time and which express themselves in the practical division of scientific labor, for instance, in the organization of the higher institutions of learning.

The largest division of knowledge may be that which separates the Theoretical Sciences and the Practical Sciences. It cannot be denied that even this separation offers logical problems. On the one side it has been said that the so-called Practical Sciences, for instance, those of the engineer or of the physician, of the lawyer or of the minister, of the diplomat or of the teacher, are after all theoretical as far as their really scientific content is concerned, while that element in them which makes them practical is an art and not knowledge. The skill in diagnosing disease or teaching pedagogically, or presenting legal argument, can be imparted by training but cannot be communicated in judgments, while every

science must be a system of judgments. The juristic of theological or technological science, on the other side, seems just as theoretical as history or mathematics. While in this way the knowledge element of the practical sciences would go over into the sphere of the Theoretical Sciences, others have taken the opposite view and have claimed that there is no knowledge but practical knowledge. It is a philosophic doctrine which became popular partly in the sphere of biological thinkers, partly among radical empiricists. They all agree that knowledge is a function of the human organisms which became developed through the practical needs of life. Every science, including all the so-called theoretical ones, thus exist only by their fulfilling certain practical needs of men.

But even if we accept the arguments on both sides, that fundamental division of Theoretical and Practical Science remains justified. The question whether all knowledge serves ultimately practical ends and has its meaning in this relation to practical purposes is an epistemological one; the separation between theoretical and practical sciences, for instance, between physics and engineering, between biology and medicine, is a methodological one. The arguments thus move on different levels. In a philosophical sense every science may be practical; in a logical sense astronomy is strictly theoretical, while the science of bridge-building is not. It is again such logical argument by which we must reject the opinion that all Practical Sciences are ultimately theoretical. Of course, if we were to call theoretical every group of propositions which can be communicated and learned, the science of bridge-building would be just as theoretical as geometry. But the logician has the duty to discriminate between these sciences which consider the facts as such without any relation to our own practical purposes and those other sciences in which the whole grouping of facts, the sifting and combining of the material, is controlled by a practical human end. Medical science is certainly made up of statements which would find their place in a complete theoretical system of the physical world. But in such a concrete description of the processes in the universe the pathological variations of the human organism would play a most insignificant rôle, and a knowledge of the chemical substances which bring harmony again into the organism would be accidental. In the Practical Science of medicine such curing of the diseases becomes a centre of the thought system, and the selection of theoretical facts which are to enter into this science is completely determined by this practical end.

It is thus not even sufficient to characterize the Practical Sciences as applied sciences. The latter expression suggests that the logical difference between the theoretical and practical disciplines is given merely by the fact that the one considers a certain relation theoretically and the other teaches how to apply it. Every Practical Science would thus correspond exactly to a special theoretical science. But the relation is a much more complex one, inasmuch as the Practical Science cannot logically be characterized by the relation to the theoretical starting point, but only by the relation to the practical end. The one end may demand the co-operation of a dozen sciences and one Theoretical Science may enter as a means into a dozen different Practical Sciences. We have to acknowledge thus for the Practical Sciences a unique and independent logical structure and the system of practical sciences would demand subdivisions which would not correspond at all to the subdivisions of theoretical knowledge. The chief human ends and aims would have to determine the grouping of these practical disciplines. We might separate thus, firstly, the Utilitarian Sciences; secondly, the Sciences of Social Regulation; and thirdly, the Sciences of Social Culture. In the Utilitarian Sciences the practical aim refers to the world of things; it may be the technical mastery of nature, or the treatment of the body, or the production, distribution and consumption of the means of support. Here belong, therefore, also the disciplines which are studied in the institutes of technology and in the medical schools, in the agricultural institutions, and so on. The Sciences of Social Regulation serve those aims which refer to the mutual relations of subjects; they deal with the political, legal and social problems. The Sciences of Social Culture, finally, refer to those aims in which not the individual relations to things or to other subjects are in the foreground, but the purposes of the development of the subjects themselves; education, art and religion here find their place.

On the other side we find, then, the universe of Theoretical Knowledge as it is studied in the collegiate departments and graduate schools of the universities. Inasmuch as the pure theoretical knowledge for Knowledge's sake made up the original meaning of the word Philosophy, the whole of it might be called Philosophical Sciences in the widest sense of the word. This tradition is still alive, for instance, in the German universities, where all Theoretical Sciences are classed together in the Philosophical Faculty as against the Faculties of Law, Medicine and Divinity; and in a corresponding way the American universities confer the Ph.D., that is, doctor of philosophy, on the student of mathematics or history, of languages or natural sciences. In the historical development of scientific work this unity of theoretical knowledge has been replaced by the most complex manifoldness of scholarly endeavors. One part of theoretical knowledge after the other was dismissed from philosophy as soon as it reached a certain independent importance, and yet philosophy in the narrower sense of the word remained in its traditional rôle of furnishing a theoretical view of the world. It was no longer identical with the totality of knowledge, but it fulfils the same purpose by bringing unity into the manifoldness of scattered special sciences, in examining their fundamental conceptions, their relative values, their methods and the position of the whole of knowledge in the system of human purposes. We can divide, thus, the totality of Theoretical Sciences from the first into the special sciences on the one side and the unifying philosophy on the other.

If we abstract from philosophy, we have thus to subdivide further the specialistic sciences. It would be certainly unfair to the actual tendencies of the scientific life of our day if we accepted the scheme which was more or less modeled after the old positivistic samples. The work which our modern historians are doing, the work of the students of litera-

ture and language, of art and religion, is not done in the spirit of those who saw in it only special applications of natural laws and thus a sociological department of biology. However widely opinions may diverge as to the logic of historical thinking, the whole scientific work of our time is decidedly aware of a fundamental difference between the naturalistic and the historical attitude toward the world. We should thus have to divide the non-philosophical theoretical sciences into naturalistic and historical sciences. The historical sciences which aim toward a connected view of the one development of our human civilization might then be subdivided into political history, history of art, history of religion, history of language, history of economics, and so on.

The natural sciences, on the other hand, which start from the single objects only to find the general laws might well be subdivided with reference to their mutual dependence. We have, then, in mechanics the science of the most general relations of natural objects; and if mechanics represents the top of this pyramid of special sciences, the lower level would be represented by physics and chemistry and the broad basis by astronomy, geology, mineralogy, botany, zoology, anthropology. There would remain uncertain the position of mathematics. In some and very important respects mathematics is a science which studies the formal relations of the natural objects and might thus well be grouped with mechanics. But at the same time mathematics has its fundamental relations to logic and thus to philosophy. The elements of mathematical knowledge are not found, like the physical things, but are created by human thoughts and their relations are valid for the universe because we cannot think the universe otherwise than through the categories of our thought. It must depend upon the emphasis which we lay on the one or the other side of the mathematical science whether we group it with philosophy or with the natural sciences.

We have further to acknowledge that the totality of sciences which are naturalistic in their logical structure cannot be grouped together into that one pyramid whose top is mechanics, because we have so far neglected the psychological sciences. Their general constitution corresponds indeed completely to the natural sciences and is thus also sharply to be separated from the historical sciences; but their material cannot be brought under the category of, mechanical movement. The mental phenomena are certainly related to the physical brain process, but the meaning of psychology is destroyed if physiological processes are really substituted for mental facts. We have thus to consider the sciences of mental life as a special group of naturalistic sciences. The top of their pyramid would be general psychology, and its basis the special sociological sciences. While psychology is thus independent and not at all merely a part of biology, we have to acknowledge it as a special science and thus to keep it separated from philosophy. That does not deny that by many traditional ties psychology is still nearly related to philosophy and it will remain so, inasmuch as its special work is more than that of other sciences dependent upon a critical philosophical examination of its fundamental conceptions.

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SCIENCES, National Academy of, an association incorporated by act of Congress, 3 March 1863, the object of which is to investigate, examine, experiment and report upon any subject of science or art whenever called upon by any department of government; the actual expense of such investigations to be paid from appropriations which may be made for the purpose. The Academy holds a stated session each year at Washington, D. C., in April and another in autumn at such places as may be determined. In 1918 there were 135 active members and foreign associates, comprising investigators in every department of science. Headquarters in Smithsonian Institution, Washington, D. C. A national research council is connected with the Academy.

SCIENCES, Normative. Normative sciences are systems of propositions whose contents are not facts, but norms; not experiences but values, and whose teaching is, therefore, not that something is, but that something ought to be. There is thus a possible place for logic, ethics and æsthetics, for philosophy of law and religion. Yet it would be meaningless to apply the term, normative sciences, to every kind of logic, ethics and æsthetics. The term has gained its characteristic importance in immediate relation to certain definite philosophical presuppositions. The conception of norm is intended to mean more than an empirical prescription, more than a social agreement which binds the individual through merely social inducements, and also more than a merely biological necessity. A large variety of so-called philosophical enterprises has been at all times and is to-day satisfied with just such sociological or anthropological doctrines of ethical, æsthetic and logical functions. There is indeed no logical difficulty in building up a system of ethics, for instance, which describes and explains how at different times and with different peoples different groups of actions became enforced through the organs of society. Biological sociology can easily show that a social organism can exist only when certain rules of behavior secure a social harmony. From the standpoint of such empirical philosophy, the moral conscience becomes an emotion which is artificially trained by the suggestions of education and the norm of action has no more value than any legal statute which is voted by a majority and reinforced by threatening the violators with punishment. From the same standpoint æsthetics describes and explains the various tastes which have been developed in the history of civilization by the silent agreement of the richest minds, their norms shading off into the changing prescriptions of fashion. Finally, in a similar way, logic becomes a description and explanation of those ways of thought which a certain period accepts as leading to such propositions as a particular society calls its truth.

In all these cases it is not meaningless to speak of an ought. Anyone who wants to agree with the demands of the community stands under a certain obligation to act, to feel and to think in the prescribed way. He must subordinate his particular wishes to the general trend, otherwise he will appear immoral or tasteless or erratic. On the other hand it is evident that the so-called norms cannot claim any other authority than as being the expression of the will of a number of individuals and as offering a certain appropriateness for the development of the social organism. Such sociological systems would themselves repudiate every idea of an absolute value for the ethical, æsthetic and logical norms; the impossibility of such a claim would seem to them sufficiently proved by the fact that one nation or one period prescribes to the conscience actions which are forbidden at another time or by another nation. In the same way the history of art shows how the æsthetic standards were changing all the time, and the history of science demonstrates how the scientific theories were always only the expressions of certain tendencies, superseded constantly by new ideas. It would thus appear absurd to claim an eternal value for the norms of behavior, of art and of science which chance to be influential with us to-day.

Those who believe in «Normative Sciences» do not contest the facts which are gathered in such sociological disciplines, and they do not underestimate their value. But they see in all such empirical accounts only contributions to the history of civilization and they believe that the conception of norms can be taken in a deeper sense, independent of the advanced prescriptions of a social organization. Norm means to them an absolute obligation, and only the consequences of the absolute values constitute for them a true Logic, Ethics and Æsthetics. Those sociological doctrines then become merely empirical introductions to the true philosophical discipline of valuable acting, feeling and thinking. The norm is then sharply to be separated from anything which in principle changes like fashions and tastes or legal statutes. The norm is that which is absolutely valuable without any reference to any individual or to any social group of individuals, independent alike of the chance obedience which individuals offer to it and of the effects which may result from its application. That two times two is four is a truth which is eternally valuable; that is, which remains valid without any reference to the question whether we understand it or not. No one may think it truth, but everyone who wants to think, ought to think so, if he is to be acknowledged at all times as a logical subject. It is of course meaningless to ask for the reasons or for the causes of such an absolute value. It is the ultimate foothold for our thought. Whatever we might offer as an explanation would have meaning only if we again called it a truth, and if we had to give account of what we mean by that, it could again be only the acknowledgment that it is that thought which we ought to think. It is a thought which we think without reference to our personal interests and without reference to any social demands but simply because we acknowledge an absolute duty to prefer this thought to its opposite.

Of course, there remains the possible objection that we can live our life without respecting such absolute duty; that we can think, for instance, without claiming more than relative value for our thoughts. We should thus be satisfied with the conviction that whatever we call truth may be found untrue by a future generation. But the philosophers of the normative sciences answer that this is an impossible standpoint. A knowledge which is not anchored in any absolute truth contradicts itself. If, for instance, the skeptical sociologist insists that there is no absolute truth, this at least is a judgment which he affirms with the conviction and with the understanding that it is itself a truth of absolute character, otherwise its meaning were lost. A consistent relativism, in short, destroys itself in the field of thought, and the acknowledgment of absolute norms is thus the indispensable presupposition for logic. A particular thought or a particular theory may, of course, be superseded, but the duty to think consistently and in accordance with logical axioms cannot be touched by the changes of civilization.

The same holds true for morality. The particular rules may change, but the meaning of morality is lost if we do not give absolute value to the fulfilment of duty. It depends upon chance conditions, which contents become the duty of the man; but he is to do what his duty prescribes independent of his personal desires, ready to sacrifice himself for that which he acknowledges as his duty; that is a norm of absolute value. The normative ethics, just as the normative logic, thus are formal disciplines. But just their independence of any special content makes those logical and moral forms eternally valid. The same repeats itself finally in the field of art and religion where again the absolute form may be filled with the varying content which the history of civilization offers, but where the form alone gives eternal meaning to the ought which is involved.

HUGO MÜNSTERBERG.

SCIENTIFIC MANAGEMENT. Definition.— The term *scientific management* characterizes that form of organization and procedure in purposive collective effort which rests on principles or laws derived by the process of scientific investigation, experiment and analysis, instead of on tradition or on policies determined empirically and casually by the process of trial and error. The principal phases of scientific management are: (1) Exhaustive investigation of the elements usable in collective effort — manual and machine processes, materials, tools and equipment, physical and psychological operating conditions — and their reactions in all possible relations, in order to determine the combination which for any specific purpose is most economical in technical energy — human and material; the formulation of the results of such investigation in principles and laws, and the establishment on the basis of such principles and laws of standards of procedure and result; (2) the development and maintenance of such precise and automatic coordination and control of the collective effort as to accomplish, in accordance with the established standards of procedure and result, with

economy of energy and time, any purpose of the collective effort; (3) organization of the personnel, processes, materials and equipment in such functional co-operative relations as to bring to bear in the collective effort the highest available and developable technical skill in planning, supervision and execution.

A clear understanding of scientific management requires that management be not confused with administration. Management characterizes the organization and procedure through which collective effort is effected; administration characterizes those considerations and decisions which establish the purposes which create the need for management and those broad, governing policies under which the management proceeds. Whether a railroad shall expend capital in further development of a main line for better service or in the acquisition of feeders for larger traffic, whether a manufacturer shall distribute through the established trade channels or through branches and stores established by himself, whether a department store shall sell trade mark merchandise or private brand merchandise, whether any institution shall operate in an extensive or a restricted area, serve a particular class of the public, establish an open or closed shop or admit its workers to some sort of participation in administration and management, are administrative problems. These problems once settled and policies relating thereto determined by the administrative authority (which may overlap or even coincide with the management authority), managerial problems arise concerned with establishing an organization and procedure, and the conduct of such procedure, to carry out the administrative policies. This distinction between administration and management clearly in mind, it may be understood that administration is largely a process of forming judgments, may have serious social, political and other moral aspects, must be largely empirical and can utilize in but a limited way principles and laws determined by the scientific method of investigation; whereas management on the other hand is concerned with the relations and reactions of particular forms of organization, routine, materials, equipment and physical and psychical conditions, may proceed upon principles determined by the scientific method of investigation and is more or less mechanistic in its nature. It may be understood also how, through absence of a clear comprehension of the difference between administration and management, and through a failure to distinguish between the nature and technical efficiency of scientific management *per se* and the administrative problems (social, political and otherwise moral) arising from its use, confusion and controversy have appeared in the public's attempt to appraise scientific management.

Early History: The System.— In 1878 Frederick Winslow Taylor (1856–1915) entered the employ of the Midvale Steel Company as a laborer who had served his apprenticeship as pattern-maker and machinist. He became successively time clerk, lathe gang boss, assistant foreman, master mechanic of repairs and maintenance, chief draftsman, and in 1884, at the age of 28, chief engineer. From the beginning of this period he was in continual struggle with the workmen to increase output, which he knew from his experience as a workman was extremely low. There developed the anomalous situation, not infrequent in industry of that day, of agreeable personal relations between foreman and individual workmen accompanied by a bitter struggle concerning output between foreman and the workers as a group. Taylor, as foreman, attempted to apply the then customary foremen's method of suasion and force with the usual result of increasing the bitterness of the struggle. Concluding that he could master the situation only by knowing more than the most skilled workman about the technique of production in the shop, and about what a skilled workman should do, he applied his investigative and inventive mind (he came subsequently to hold over 100 patents) to the problem and began two lines of experiments which he pursued through many years with great thoroughness and at great expense. One related to the machine, the tool and the material (metal cutting), and the other to the workman's method of handling the machine, the tool and the material (time and motion study). The former line of experiments, continued later at the Bethlehem Steel Company, led to the discovery of high-speed steel, and revolutionized the art of metal cutting ('Transactions American Society of Mechanical Engineers,' XXVIII, 21, 1906); the latter line of experiments greatly broadened led to the development of a co-ordinated system of shop management and ultimately, as an interpretation of that system, to the formulation of the philosophy of management which came to be known as scientific management. The logical and approximately the chronological steps of the development of the system of management, essential to an understanding of the principles which came to be formulated, were: (1) Experiments leading to dependable knowledge of how long a particular machine operated, or a particular manual process performed, by a skilled workman would require to accomplish any specified result, with a given material, according to a specified most effective method of operation, and under specified working conditions. This knowledge, obtained principally by stop-watch studies of unit-time performances, permitted the setting of practicable standards per man-hour or machine-hour higher than the average of current performance; (2) the establishment of a routine of preparation and direction which would ensure maintenance of the conditions under which the standards were set, which led to the working out of such mechanisms as routing, order of work, instruction cards, purchasing materials according to specifications, central stores and controlled conditioning and delivery of materials and tools; (3) the selection and assignment of personnel to machines or operations on the basis of skill and the further development of skill in workers; and (4) the establishment of specialized skilled supervision of workmen to ensure maintenance of conditions and to provide instruction. These objects (3 and 4) were accomplished by functionalized foremanship, a gang boss having general supervision of the order of work in the shop, a speed boss supervising the setting up of the machine and an inspector inspecting the product both at the beginning and at the completion of a job. (5) The constant and current checking of progress against standards by cost accounting, the data for which was derived from the operating papers; and (6) of far-reaching importance in its ultimate influence on the managerial attitude of mind, the substitution in place of the conventional "foremen's persuasion" in securing performance by workers, of voluntary application on the part of the latter through the incentive of a higher wage made possible by the increased productivity. During the years 1891–1900 these gradually developed devices became co-ordinated into a smoothly-working system, in which those supervisors whose duties required personal contact with workers remained in the shop, while those whose duties were in the nature of planning, preparation and control through "papers" were brought together in an office called the "planning room," adjoining the shop.

Later History: the Principles.— The interpretation of this system of management in terms of principles of management seems to have been inspired by Taylor's contacts in the American Society of Mechanical Engineers, which he joined in 1886. In that year, Henry R. Towne presented to the society the paper "The Engineer as an Economist" ('Transactions American Society of Mechanical Engineers,' VII, 425–32, 1886), significant because first directing attention to management as something other than the expression of executive ability, in the assertion that to ensure good management there must be joined to executive ability "a practical knowledge of how to observe, record, analyze and compare essential facts in relation to wages, supplies, expense accounts, and all else that enters into or affects the economy of production and the cost of the product." During the 10 years following the presentation of that paper other papers, relating principally to a particular phase of the management problem — methods of wage payment, were presented and discussed in the Society. Taylor's "A Piece Rate System" ('Transactions American Society of Mechanical Engineers,' XVI, 856–903, 1895) is the most notable among these in that he therein described the general system of management which he had developed, arguing that it embodied managerial principles which must be the basis of any sound system of wage payment involving premiums or other differential reward. The title and emphasis of this paper centred attention on his differential piece-rate and not, to his disappointment, on the management principles implied. Therefore, in 1903 he again appeared before the society with the paper "Shop Management" ('Transactions American Society of Mechanical Engineers,' XXIV, 1337), in which he attempted to direct attention from his piece-rate system to what he called a philosophy of management. The body of this philosophy, as presented by him, was essentially the following principles: (1) The objective of good management is the combination of high wages and low unit costs; (2) this objective can be achieved only by the application of strictly scientific methods of research and experiment to the study of the detail problems of management, and (3) the establishment thereby of laws or principles which may be expressed in standards of procedure which give control of operation; (4) the scientific selection of workmen, materials and processes and the establishment of working conditions to meet the requirements of the standards; (5) the scientific training of the workmen to improve the application of their skill in accordance with the standards; and (6) the establishment of such intimate and friendly co-operation between management and workers as to ensure a stability of the psychological environment of the shop which would make possible the application of all the principles above enumerated and the utilization of the mechanisms necessary to give them effect. It should be observed that a systematic and complete formulation of the principles of scientific management was not for Taylor or his generation.

Recent History: since the Eastern Rate Case.— Again Taylor's audience in the American Society of Mechanical Engineers failed to appreciate the significance of his contribution. Interest of the members of that society and of the public in general was attracted, not by these serious, scientific papers and discussions, but by sensational testimony concerning the results of scientific management in the shops in which it had been developed, given at a hearing before the Interstate Commerce Commission in 1911, involving consideration of the efficiency of the railroads (Interstate Commerce Commission reports, XX, 243), and at an investigation in the same year by a special committee of the House of Representatives appointed to investigate, on a petition of organized labor, the effects of Taylor methods at Watertown Arsenal. It was at these hearings and in the title of a book which Taylor published at this time ('Principles of Scientific Management,' 1911) that the term "scientific management" was first used. From that time on public interest in scientific management was intense and sustained, and discussion of it continuous and occasionally acrimonious, although not always discriminating. Interest and discussion was not confined to the United States, and foreign demand caused the translation of Taylor's papers into French, German, Italian, Japanese, Dutch, Russian and Lettish.

This sudden intensification of interest in scientific management may be accounted for by the fact that in 1911 the industrial community was prepared for such a body of logical and practical management principles manifested in a comprehensive system of management mechanisms. There had been for a decade a growing general interest in betterment of management. This general interest had yielded improved management devices such as cost accounting and "systems" of control through "forms" which made more precise but did not modify to any great extent existing practice. It had inspired an increasing volume of books and articles concerning special problems of management and descriptive of industrial organizations and procedures which represented the best in existing practice. It had led to books and articles of an exhortatory nature and of stimulating influence which gave a touch of idealism to the consideration of management problems (Harrington Emerson, 'Efficiency as a Basis for Operation and Wages,' 1909; 'Twelve Principles of Efficiency,' 1910). But it was not until the Eastern Rate Case of 1911 that interest became widespread and intense. The testimony concerning the accomplishments of scientific management in decreased unit costs and in-

creased profits combined with higher wages appealed to the primary motive of industrial activity; the completeness and coherence of Taylor's system and of the principles which it expressed appealed to the intellect of the serious student of management problems; and the very term "scientific management" appealed to the imagination of everyone. The public mind and discussion at once seized upon the term and gave it a generalized application almost as broad as had been represented by the term "efficiency." For that reason students of management must exercise discrimination in distinguishing between the definite, historical meaning and the popular, generalized meaning of the term, and between real, partial and in some instances alleged cases of the application of the principles.

Results.— The results of the development of scientific management in industrial plants have not been adequately summarized and presented. Management engineers have been conservative, as a matter of professional ethics, in disclosing results of work in the plants of their clients. Many investigations by others have been vitiated by one of two attending circumstances; either the investigator has been biased in a desire to find controversial evidence or by a preconceived philosophy of industrial relations; or he has failed to inform himself concerning the history and nature of scientific management, and has been led to investigate plants reputed to have, but really not having, scientific management. The most reliable and complete evidence of results is to be found in the records of the hearings before the Interstate Commerce Commission and of the special committee of the House of Representatives, referred to above, veritable mines of information, and the most satisfactory summaries in articles by C. Bertrand Thompson ("The Theory and Practice of Scientific Management," Ch. III) and Henry H. Farquhar (in *Quarterly Journal of Economics,* XXXIII, 466); in Brandeis' 'Scientific Management and Railroads' (1917), a published part of a brief submitted to the Interstate Commerce Commission, and in the reports of the Chief of Ordnance, United States of America, 1911, 1912 and 1913. It is the concurring testimony of these several investigations that scientific management reduces unit costs and increases wages and profits, in many instances simultaneously with reduction in selling prices, and that industrial relations with the workers immediately concerned are improved.

Labor and Scientific Management.— An almost incomprehensible phase of the history of the scientific management movement is the existence, side by side, of improved industrial relations in those plants in which scientific management has been developed and strong opposition on the part of the management of the American Federation of Labor. The opposition of the management of organized labor seems to have been inspired by fear of the impairment of a fundamental element of their strategy (that their organization must be increased in membership and held intact, for the accomplishment of their larger objectives) by one of the least important mechanisms of scientific management, the differential wage system. Inspired by this fear, and taking advantage of certain opinions held by workers (such as the opinion that increased output will cause unemployment) and certain infelicities of speech and illustration on the part of expounders of scientific management (such as the famous Schmidt case), and presenting statements concerning the actual operation of scientific management not based on critical investigation and not conforming to facts (that workmen are speeded up and worn out, that time-studies are secret, that rates are cut, etc.) the management of organized labor undertook a campaign of education of its membership which resulted in an almost solid opposition by the rank and file as well as the officers of organized labor to scientific management. In public discussion, to the opposition of organized labor was added the opposition of many social scientists who, without information derived from either experience or investigation, asserted that scientific management would make impossible the achievement of any ideal of industrial democracy. Throughout all this controversy the natural confusion of polemical discussion was worse confounded by absence of critical investigation of facts, inadequate information, and particularly by a failure to distinguish in the discussion of scientific management as a social problem, between management and administration. In this controversy the arguments against scientific management as a system of management technique were ineffective because not supported by the facts; on the other hand the arguments against scientific management with respect to its social implications were significant and of influence, but they were really arguments concerning administrative policy governing the use of management technique, and not more pertinent to scientific than to any other form of management. Superficial critics failed to perceive the point that the effective working of the scientific management mechanisms in particular depends so vitally upon sympathetic co-operation between planner, supervisor and operator, that antisocial administrative policy is inconsistent with its development and technical effectiveness.

Influence of the War.— The status of scientific management has been profoundly influenced by the war. Three influences are noteworthy: (1) Although the prejudice of workers engendered by the sharp controversy preceding the war has not disappeared, open and active hostility of labor has been discontinued and apparently will not be resumed; (2) the demand for output during the war, supported by labor, compelled a wider extension of efficient production methods, in some instances of the methods of scientific management, not only in the United States but also in Europe, and both labor and management have learned by experience that scientific management technique is not inconsistent with wise, humane and co-operative administrative policies; (3) labor and management have observed that during and following the war managers of scientific management plants and scientific management engineers have been in the van of those inspiring and directing the establishment of the most humane and co-operative administrative policies, in accordance with the most farsighted principles of industrial relationship. War seems to have cleared away prejudice and misunderstanding and to have made possible an appreciation of the value of scientific management as an instrument for the increase of the productivity of human effort under wise administration.

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SCIENTIFIC SOCIETIES, organizations of scientists for the furthering of scientific study. They are largely devoted to the furthering of research work and the publishing of scientific journals, memoirs, etc.; and their conventions, which in the case of the larger societies are usually held in different large cities, promote discussion and intercourse among scientific students. The most important of the older scientific societies of foreign nations are the Royal Society of London (founded 1660), the Royal Institution of Great Britain (1799), the French Academy of Sciences (1666), the Imperial Academy of Sciences, Russian (1725), and the Royal Academy of Sciences of Germany (1700), of Sweden (1739) and of Denmark (1743).

The American national societies include the American Philosophical Society, founded 1743, the American Academy of Arts and Sciences (1780), the American Association for the Advancement of Science (1848), and the National Academy of Sciences (1863). In addition there are local academies or scientific societies in many States and cities. These often have a museum and scientific library, and hold meetings for scientific discussion. The oldest of these is the Connecticut Academy of Arts and Sciences at New Haven, founded in 1799; the Maryland Academy of Sciences dates from 1819; the California Academy of Sciences, in San Francisco, from 1853. So many have since been established that it is impossible here to catalogue them. In all of the States there are academies that hold winter meetings, with programs covering the different sciences. Among the prominent city institutions are the New York Academy of Sciences, founded 1817, the New York Scientific Alliance, the Philadelphia Academy of Natural Sciences, the Boston Scientific Society, the Boston Society of Natural History and the Chicago Academy of Sciences. Other cities having scientific academies or societies are Salem, Worcester, Gloucester and Williamstown, Mass.; Portland and Augusta, Me.; Hanover and Keene, N. H.; Brattleboro, Vt.; Providence, R. I.; Hartford, Meriden, New Britain, Middletown and Bristol, Conn.; Albany, Buffalo, Rochester, Binghamton and Poughkeepsie, N. Y.; Reading and Media, Pa.; Wilmington, Del.; New Orleans, La.; Saint Augustine, Fla.; University, Ala.; Chapel Hill, N. C., Detroit, Mich., Saint Louis, Mo.; Brookville and Terre Haute, Ind.; Elgin, Peoria and Princeton, Ill.; Davenport and Muscatine, Iowa; Saint Paul, Minn., and Topeka, Kan.; Santiago and Santa Barbara, Cal., and Tacoma, Wash. In addition, there are various institutes that are really the home of many scientific societies. See SMITHSONIAN INSTITUTION; CARNEGIE INSTITUTION OF WASHINGTON; BROOKLYN EDUCATION, etc.

The work of these general societies has suffered from the specialization which the growth of modern science requires; the American Association for the Advancement of Science, the New York Academy of Science, and others of the larger organizations have met this requirement by a subdivision into sections for the different sciences. The specialization, however, has been favorable to the establishment of local and national societies devoted to single sciences and the various technical branches. All the leading sciences have national organizations in the United States; among such are the American Chemical Society (1876), the American Entomological Society (1859), the American Mathematical Society (1888), the American Society of Naturalists (1883), the Astronomical and Astrophysical Society of America (1897), the Botanical Society of America, and the Geological Society of America (1888). The societies of technical science, while somewhat concerned with the professional interests of their members, are chiefly devoted to research. The oldest of these is the American Society of Civil Engineers (1852); others are the American Institute of Electrical Engineers (1884), the American Society of Mechanical Engineers (1880), and the American Institute of Mining Engineers (1871). For a complete list consult 'Handbook of Learned Societies,' published by the Carnegie Institution at Washington, D. C.

SCILLA, SQUILL, WILD HYACINTH, or **BLUE BELL.** See BLUEBELL.

SCILLY (sĭl'ĭ) **ISLANDS,** England, a rocky granitic group at the entrance to the English Channel, forming part of Cornwall, about 30 miles from Land's End. They rise abruptly from the sea, form a compact group about 30 miles in circumference, and are about 140 in number; there are only six of any importance, the remainder being mere rocks and islets. The six are Saint Mary, Saint Agnes, Saint Martin, Tresco, Bryher and Sampson. Saint Mary, the largest, contains Hugh Town, the capital. Telegraph and telephone connections with the mainland and a periodical steamer service with Penzance facilitate communication. The climate is very mild and equable, and plants flourish out-of-doors that do not grow elsewhere in England. The inhabitants are chiefly engaged in flower-growing, agriculture and fishing. Immense quantities of narcissus and similar flowers are sent to London in spring, and early potatoes and other vegetables are also grown. The grain crops include a small proportion of wheat. On several of the islands are to be seen prehistoric remains of rude pillars, circles of stones, kistvæns, rock basins and cromlechs. The islands are the unsubmerged portions of the traditional land of Lyonesse. The group is named from an almost inaccessible island about an acre in extent, probably from its position near dangerous rocks, similar to that of Scylla near Sicily. The islands were granted to some monks, who settled at Tresco, by Athelstane in 936. Subsequently Henry I granted them to

the Abbey of Tavistock, and Queen Elizabeth gave them to the Godolphin family. They are now the property of the Crown.

SCINTILLATION, the scientific term for what is familiarly called the twinkling of the stars. We all know that this cannot arise from any actual change in the light of the star itself; and it must have long been evident that it is due to the atmosphere through which we necessarily see the stars. But the exact way in which the atmosphere produces this effect is a question on which the views of experts have differed. Arago, in an essay on the subject, cites a dozen different explanations of the effect; and since his time many other writers have propounded explanations. But there is not so much divergence between these different theories as might appear at first sight, and physicists of the present day will probably agree upon the essential cause of the phenomenon. If the atmosphere were perfectly at rest, it is certain that there would be no twinkling, any more than there would be in looking at a star through a piece of glass. The stars scintillate because the atmosphere is continually in motion. Invisible waves produced by the ascent and descent of warm and cold currents of air are always present. We can see these waves at the side of a hot stove, or, in summer time, on the side of a brick wall heated by the sun, or on a road passing over the top of a hill when we are so situated that the sky-line is the road itself, and the latter is heated by the sun's rays. In consequence of these wave-like motions, a ray of light coming from a star is continually undergoing a slight refraction or bending of its course, which is changing every moment and is not the same even for two rays side by side. The result is that a ray of light which would reach the eye if it kept on its course is refracted away, while another ray reaches the eye which was not directed exactly toward it. But there may be no relation between these two rays; and thus sometimes for a moment less light will reach the eye, and at the next moment more. Thus we have the scintillation. The rays which actually come to the eye also reach it from slightly different directions. Thus the direction of the star also seems to change in twinkling, but this change is not noticeable except when we use a powerful telescope. Then, in an unsteady atmosphere, the stars seem to dance round and change their form in a manner which is very troublesome to the astronomical observer.

It is not the stars alone which twinkle. If we watch gas or electric lights of an evening several miles away we shall always see twinkling. As a general rule, the planets do not twinkle like the stars unless very near the horizon. This is because their visible disc has a certain surface, so that the rays of light which reach the eye from the planet do not pass through the air along a single fine line, but form a cone of which the breadth at any point is proportional to the distance of the point from the eye of the observer, and may be a foot or more in diameter at a distance of two or three miles.

If we view a bright star through a spyglass and give a slight motion to the latter so as to shake the image of the star round, we shall see that it is continually changing in color, going through most of the colors of the spectrum from red to blue. This is probably caused by the different refractions of the rays of light of different colors, which are separated in the way we have described and then brought together again. The result may be partly due to the interference of light, an effect which cannot be treated in the present article.

The scintillation is always greater near the horizon, and least around the zenith. This is because the layers of the air are denser and more disturbed near the horizon, while the course of a ray of light through them is longer.

SIMON NEWCOMB.

SCIO, sī'ō or shī'ō. See CHIOS.

SCIOPPIUS, stsē-ōp'pē-oos, **Kaspar,** German scholar: b. Neumark in the Palatinate, 27 May 1576; d. Padua, Italy, 19 Nov. 1649. He received his education at Heidelberg and at Altdorf, and before the age of 21 had published several learned books, the most noted being his 'Verisimilium Libri Quatuor,' and 'Suspectæ Lectiones,' which attracted the attention of Pope Clement VIII. During a visit to Italy in 1589 he renounced Protestantism, and became a protégé of the Vatican. He is said to have written more than a hundred books, most of them under an assumed name, satirizing the leaders of the Protestant movement. The first person whom he attacked was the illustrious Joseph Justus Scaliger (1540–1609), against whom he launched his 'Scaliger Hypobolimœus' (1607), in which he also assailed Henry IV. In 1608 he published more than 20 pamphlets against the Protestants, urging the Roman Catholic powers to exterminate them. Among his later books the most notable are 'Grammatica Philosophica' (1628), and 'Paradoxa Literaria' (1628).

SCIOTO, sī-ō'tō, a river in Ohio which rises in Auglaize County, flows southeast for a few miles, then northeast into Hardin County, then south by east to near the centre of Marion County, from where its general direction is south to the Ohio River, which it enters near Portsmouth. Other cities on its banks are Columbus, Circleville and Chillicothe. It is about 200 miles long, is navigable for about 130 miles and for 90 miles feeds the Ohio and Erie Canal. It flows through a fertile valley.

SCIOTO COMPANY, The, in American history, a land-speculating organization formed in the Eastern States in 1787 for the purchase of territory along the Ohio and Scioto rivers. John Cleves Symmes, Joel Barlow and William Duer, of New York, were largely interested. The organizers at first bought lands of the Ohio Company and appointed Barlow their agent in Europe to make sales of them and to induce immigration. Barlow had been in England previously on similar business for the Ohio Company. Symmes parceled out the lands to other parties, the tract which now embraces the city of Cincinnati falling to the share of Matthias Denman, Robert Patterson and John Tilson, of New Jersey. As a result of Barlow's activities 218 emigrants sailed from Havre to settle on those lands, 19 Feb. 1790. About 50 of them settled at Marietta and the remainder formed the Gallipoli's settlement. The emigrants suffered from lack of promised supplies and inability to get clear titles to their lands, and the company, failing to meet its obligations, was charged with swindling operations.

SCIPIO ÆMILIANUS AFRICANUS MINOR, sĭp'ĭ-ō ē-mĭl-ĭ-ā'nŭs ŏf-rĭ-kā'nŭs mī'-nōr, **Publius Cornelius,** Roman soldier: b. about 185 B.C.; d. 129 B.C. He was an adopted son of P. Cornelius Scipio, the son of Scipio Africanus Major. He began his public career in 151 when the Roman senate was about to dispatch a new army to repress the disturbances in Spain. Exasperated by the constant failure of the wars against the Spanish tribes, the people obstinately refused to serve. At this juncture Scipio came forward, and by a spirited and powerful harangue, made such an impression on the public mind that a multitude of Romans of all classes voluntarily enlisted. In 152 he accompanied the consul Lucius Licinius Lucullus to Spain as military tribune. In 149 B.C. the Third Punic War broke out, and Scipio followed the army to Africa. He served under the consul M. Manlius Nepos, and by his courage and vigilance rendered important services. Manlius recommended him in the most emphatic manner to the senate. Hence in 147, contrary to the usual custom, not being of the legal age, he was unanimously chosen consul and leader of the forces against the Carthaginians. The Carthaginians defended themselves with desperate courage, but although able to hold out until winter brought a temporary cessation of hostilities, on their resumption Carthage was reduced in 146.

By the express command of the Roman senate this rival of Rome, once so powerful, was demolished and burned. The sight of the ruined city affected Scipio to tears. He was honored with a magnificent triumph at Rome after the war was terminated, and was surnamed the "younger Africanus." After he had lived for some time as a private citizen he was sent with other ambassadors to Egypt, to King Ptolemy Euergetes, where he was much admired for his genuine Roman moderation, and his thirst for knowledge. When he returned (142) he was elected censor. In 134 he entered on his second consulship, in order to put an end to the war long carried on with Numantia. After a siege of eight months he forced a surrender.

For his conquest of this powerful city a triumph was decreed to Scipio, and he received the surname of "Numantinus." In the last years of his life he made himself many enemies among the people by opposing the measures of the popular party, and especially the agrarian law of Tiberius Gracchus, of which Papirius Carbo and Gaius Gracchus, the tribunes of the people, were the great supporters. The circumstances of his death indicate that he was poisoned by his foes.

SCIPIO AFRICANUS MAJOR, sĭp'ĭ-ō ăf-rĭ-kā'nŭs mā'jŏr, **Publius Cornelius,** Roman soldier: b. 237(?) B.C.; d. 183 B.C. In 212 he was unanimously elected ædile, and in 210 became proconsul in Spain. His first successful enterprise of importance was the conquest of New Carthage, the stronghold of the Carthaginians in Spain. For the kindness and magnanimity he displayed on this and other occasions toward the native Spaniards he was rewarded by numbers of them attaching themselves to his standard. The next year (209) Scipio totally defeated Hasdrubal, Hannibal's brother, notwithstanding the latter's advantageous position, but was unable to prevent him collecting more troops, and eventually crossing the Pyrenees to the assistance of Hannibal. In the meanwhile the Carthaginians collected a fresh army, which Scipio decisively defeated in 207. The result of this and subsequent engagements of minor importance was that the Carthaginians were wholly driven from Spain, and the greatest part of their country subjected to Rome. In 205 Scipio was elected consul. He now besought the senate to allow him to lead an army against Carthage herself, and was accordingly empowered to go to Sicily with an army and a fleet, in order, after mature deliberation on the means of effecting a landing on the coast of Africa, to execute the plan he had formed. In 204 he sailed from Lilybæum and landed in Africa, where he prosecuted hostilities with increased vigor, and such success as to oblige the Carthaginians to recall Hannibal from Italy. The Carthaginian army, however, had been by this time so much reduced that that general was able to effect but little change, and after some fruitless negotiations for peace the great battle of Zama was fought 19 Oct. 202 B.C., resulting in the total defeat of the Carthaginians. The latter, on the advice of Hannibal, sought for peace, which was granted on hard conditions. On his return to Rome, Scipio was honored with a triumph, and received the surname of "Africanus." He was censor in 200 and consul in 194 (with Titus Sempronius Longus). In 189 he was accused of peculation and bribe-taking. When his trial came on he contented himself, in answer to the accusations of his enemies, with reminding them of what he had done for the republic, and ended by saying that this was the anniversary of the defeat of Hannibal at Zama, and calling upon the people to neglect all disputes and lawsuits, and follow him to the Capitol, there to pray the gods that they would grant the Roman state other citizens like himself. This they did, leaving the accusers alone in the forum. Scipio immediately quitted Rome, and retired to his villa at Liternum, where he spent the few remaining years of his life.

SCIRE FACIAS, sī'rē fā'shĭ-ăs, a judicial writ, directing the adverse party to show cause why the plaintiff is not entitled to execution or other benefit on a judicial record, as a judgment, or why a non-judicial record, as a patent, should not be declared invalid; also, the proceedings under such writ. The defendant may make the same defenses to this writ as to an action. It is often issued to revive a judgment. In the Federal courts of the United States a proceeding in the nature of a scire facias is used to annul letters patent for inventions. In England it is still used in garnishee proceedings in certain cases, in revenue suits involving corporations, and to enforce judgments against shareholders in certain companies, but it has been abolished there in proceedings to annul letters patent for inventions. It has been abolished in some code States in this country and a motion used in its place.

SCIRPUS, sĕr'pŭs, bulrush, sedge, a large genus of rush-like or grass-like plants of the sedge family (*Cyperaceæ*) universally distributed. Many species are of partial or complete aquatic habit, annual or perennial, some small or some

large. The small, perfect flowers have usually a perianth of bristles, and are in spikelets, with or without subtending involucres, and mature into variously shaped achenes. The spikelets are either solitary or in groups, and are very commonly umbelled. These plants are often called rushes or bulrushes, and are common in wet woods or swamps, and often rise conspicuously out of shallow water. *Scirpus cyperinus,* the brown wool-grass, has immense drooping umbels of spikelets, supported on slender cylindrical stems. It is perennial, two to six feet high, with curving grass-like leaves, and is a familiar plant at the edges of forest ponds, growing in colonies. *S. cernuus,* one of the few species cultivated, is a good pot-plant, having long drooping stems, forming a dense mat at the base, and with solitary spikelets. *S. lacustris,* the great bulrush of the Old World, is known as the mat-rush, because it was employed for weaving into mats, chair-bottoms and cordage. It is a curious aquatic plant whose very smooth, blue-green, tall stems bear at the top flexuous umbels of spikelets. This species and the allied *S. tatora,* are the "tulés" (q.v.) of the American Southwest.

SCIRRHUS, or **HARD CANCER,** a scirrhous cancer. See CANCER.

SCISSOR-BILL, a bird. See SKIMMER.

SCISSOR-TAIL, a beautiful flycatcher (*Milvulus forficatus*) of the lower Mississippi Valley, which receives its name from its habit of crossing and recrossing in flight the two very long outer feathers of its tail. It is white with dark wings and a roseate flush upon its breast and on the lining of its wings, and is exceedingly graceful. Its general habits are those of the flycatchers (q.v.).

SCISSORS. See CUTLERY; HARDWARE INDUSTRY IN AMERICA.

SCLEROMETER, sklér'ŏm-ĕ'tẽr, an instrument for the accurate determination of the hardness of minerals. In one form the mineral is mounted on a small carriage moving along a track. Upon this is a lever with weighted diamond point which is in contact with the surface to be tested. Weights are then added to a pulley connected with the carriage until they are just sufficient to move the carriage and produce a scratch on the mineral. In the microsclerometer of Jagger hardness is ascertained with any one of four variables: rate, weight, depth or duration (see *Amer. Jour. Sci.,* IV, 399, 1897). The sclerometer shows that different faces of crystals vary in hardness. By rotating a crystal through 180 degrees and recording the weight required to produce a scratch for each 10 degrees, it is possible to secure data from which the "curve of hardness" can be constructed. Jagger has determined the absolute hardness of some of the minerals in the Mohs scale, assuming a value of 1,000 for corundum, as follows: topaz 152, quartz 40, othoclase 25, apatite 1.23, fluorite .75, calcite .26, gypsum .04.

SCLEROTIC, SCLEROTICA, or **SCLEROTIC COAT.** See EYE.

SCOLECIDA, skŏ-lĕs'ĭ-da, a group of worms and worm-like animals, mostly internal parasites, term now used only in a general way, as its members have been more scientifically distributed in classification in the phyla *Platyhelminthes, Nematohelminthes,* etc.

SCOLECITE, skŏl'ę-sīt, a mineral belonging to the natrolite group of the zeolite family. It is a hydrous silicate of aluminum and calcium, $CaAl_2Si_3O_{10} + 3H_2O$. When heated before the blowpipe it swells and sometimes curls up like a worm, to which property it owes its name, from the Greek *skolex,* a worm. It then fuses easily to a white, blebby enamel, thus distinguishing it from natrolite, which fuses with equal ease and without intumescence to a colorless glass. Its crystal habit is slender-prismatic and much resembles natrolite. Its crystals are, however, horizontally striated on the prisms and are monoclinic twins, the twinning being revealed by feather-like diverging striations on the clinopinacoid, while natrolite crystals are orthorhombic and show vertical striations in the prismatic zone. Its snow-white or transparent, vitreous crystals are usually clustered in diverging groups. It is also found massive or in radiated nodules. It is a secondary mineral usually in trap or amygdaloid. Among the best known of its many localities are Poona, British India, and Berufiord in Iceland; it has been found sparingly in the United States in the Palisades of the Hudson and at Golden, Colo.

SCOLLARD, skŏl'ard, **Clinton,** American poet and novelist: b. Clinton, N. Y., 18 Sept. 1860. He was graduated from Hamilton College in his native place and was a professor of rhetoric and English literature there 1888–96 and 1911–12. He has traveled extensively, and since the last-named date has devoted his entire attention to literary pursuits. His early work was mainly verse of a light and musical character evincing great command of metres, but with no very salient characteristics. His later verse shows a marked increase of strength as well as melody, while the earlier facility has now become an almost faultless technique. The lyric is his especial field, although he has now and then attempted epic forms. In recent years he has produced several noteworthy historical romances. Among his books of verse may be cited 'Pictures in Song' (1884); 'With Reed and Lyre' (1886); 'Old and New World Lyrics' (1888); 'Songs of Sunrise Lands' (1892); 'Lyrics of the Dawn' (1900); 'The Lutes of Morn' (1901). His most important novels are 'A Man at Arms' (1898); 'The Son of a Tory' (1900); 'The Cloistering of Ursula' (1902); 'Lyrics of the Dawn' (1902); 'Count Falcon of the Eyrie' (1903); 'Footfaring' (1904); 'The Lyric Bough' (1904); 'Ballads of Valor and Victory,' with Wallace Rice (1904); 'Lyrics and Legends of Christmas-tide' (1904); 'Odes and Elegies' (1905); 'A Southern Flight,' with F. Dempster Sherman (1906); 'Easter Song' (1907); 'Voices and Visions' (1908); 'Pro Patria' (1909); 'Chords of the Zither' (1910); 'The Vicar of the Marches' (1910); 'Songs of a Syrian Lover' (1911); 'From the Lips of the Sea' (1911); 'Lyrics from a Library' (1913); 'Poems—Selected' (1914); 'The Vale of Shadows and Other Verses of the Great War' (1915); 'Italy in Arms and Other Verses' (1915); 'Ballads Patriotic and Romantic' (1916); 'Let the Flag Wave and Other Verses' (1917); 'Elegy in Autumn' (1917). Mr. Scollard edited Fords' 'Broken Heart' (1894); 'Ballads of American Bravery' (1900), and 'Poems' of Frank Dempster Sherman.

SCOLOPACIDÆ, skŏl-ō-păs'ĭ-dē, a cosmopolitan family of wading birds, comprising the snipes, sandpipers, curlews and allied genera. The bill is long, very slender and flexible. They frequent bogs and marshes or the banks of rivers and ditches, where they probe the ground for worms, insects and testaceous mollusks. In the most modern classification these groups of birds are combined with the plovers, under the broader name *Charadriidæ,* of which all but the plover (*Charadriinæ*) constitute the subfamily *Scolopacinæ.* Consult Evans, 'Birds' (New York 1900).

SCOLYTIDÆ. See BARK-BEETLES.

SCOMBRIDÆ, skŏm'brĭ-dē, a family of percomorphous fishes, comprehending the mackerel (q.v.) and its allies. The body has an elongated fusiform shape, oval in cross-section, with a conical pointed head and deeply forked caudal fin with falcate lobes. The scales are minute and anteriorly form a peculiar area known as the corselet, and the prominent lateral line takes a wavy course for its entire length. The mouth is large and armed with strong, sharp teeth, the eye large and the gill-slits extensive and free. Of the fins the pectorals and ventrals are small, the former situated high on the sides and the latter on the belly nearly or quite beneath them; the spinous dorsal is far forward and supported by slender spines; the second dorsal and anal are of similar shape and usually situated near the level of the vent, and each is continued to the base of the tail by a series of small detached finlets. The caudal peduncle is slender and bears lateral keels. The colors are generally metallic steel blue above, marked with bands, streaks or spots of black or yellow and silvery white or golden below. Internally the pyloric cæca are numerous and the swim bladder may be present or absent. The flesh is oily and a streak of deep red muscle extends along either side and is sharply distinguished from the remaining pale muscles. All of the mackerels are extremely active, predaceous, pelagic fishes, which roam far and wide over the sea in large schools and often approach the coasts to spawn. They are especially well adapted by the form of the body for rapid swimming, and resistance to the water is much lessened by the completeness with which all fins and other prominences can be depressed into recesses, so that they become exactly flush with the surface. The number of genera and species is not great, about 12 of the former and 60 of the latter being recognized, but most of them are widely distributed and have occurred or are likely to occur in our waters. Besides the mackerel, some of the most important are the Spanish mackerel, bonitoes and tunnies or horse mackerel. Consult Jordan and Evermann, 'American Game and Food Fishes' (New York 1902).

SCONE, skoon, Scotland, a village in Perthshire, on the north bank of the Tay, a little above Perth, famous as having been the seat of one of the most noted Scotch abbeys. Scone is first mentioned in the beginning of the 10th century and in its abbey, built probably about the same period, was located the famous stone, according to tradition "Jacob's Pillow," on which the kings of Scotland were crowned, and which was carried by Edward I of England to Westminster Abbey where it rests under the coronation chair. The last coronation celebrated here was that of Charles II in 1651. The old abbey is represented only by scattered traces; on the site of the ancient palace stands the fine modern mansion of the Earl of Mansfield. The neat little village of New Scone nearby has about 1,500 inhabitants, chiefly engaged in hand-loom weaving.

SCOPAS, skō'pas, Greek sculptor: b. Paros, and flourished between 395–350 B.C. He was the son of Aristandros, a sculptor in bronze, and went to Athens about 377 B.C., where he lived about 25 years. He belonged to the Later Attic School of which Praxiteles was another distinguished member. For the temple of Athena Alea at Tegea he made the sculptures of both pediments and the statues of 'Asklepios' and 'Hygieia' for the interior. In various parts of the Peloponnesus he executed statuary, as for instance, the 'Asklepios' at Gortys, in Arcadia, a 'Herakles' at Sicyon; an 'Athena Pronaos' and on 'Artemis Eucleia' at Thebes; also a group 'Eros, Himeros and Pothos' (Love, Longing and Desire) at Megara. One of his most famous statues was the 'Bacchante,' ornamenting the theatre of Dionysus at Athens; another was the 'Niobe' of which the copy of the lost original is in the museum at Florence. He is credited with having wrought some of the ornamental sculpture of the tomb of Mausolus at Halicarnassus in Caria, portions of which are now deposited in the British Museum. He was more extreme than Praxiteles in his departure from the repose of the earlier Phidian manner. With him sculpture represented many of the violent emotions of life, expressed with great freedom of movement. The lines of the figure, though flexible, were made to convey vehement bodily action, and the face often wore the expression of intense feeling, as, for instance, may be noted in the lines of grief in the face of Niobe. Consult Perry's 'Greek and Roman Sculpture' (1882), and Hoppin, J. M., 'Great Epochs in Art History' (1901).

SCOPOLAMINE, skō'pō-lăm'ĭn, or **HYOSCINE,** hī'ō-sēn ($C_{17}H_{21}O_4N$), an alkaloid obtained from various plants of the Solonaceæ, used in medicine as a soporific and anesthetic, and generally employed in the form of scopolamine hydrobromide ($C_{17}H_{21}NO_4$, $HBr,3H_2O$). It is valuable as a cerebral sedative. For the relief of pain it is combined with morphine, and it heightens the effect of bromides. It is regarded as uncertain in its effects. In large doses it results in loss of memory while under its influence, a characteristic which led to its employment in the combination of drugs used to induce the condition known as "Twilight Sleep" (q.v.).

SCORE, *in music* the original transcript of a musical composition, with the parts for all the different voices or instruments arranged and placed in juxtaposition; so called from the practice of drawing the bar through all the parts. As a general rule the highest part should be placed uppermost, the others under it and each other, according to the lowness of the part.

All the parts of a chorus should be placed together: the soprano standing on the upper staff, the mezzo or second soprano (if any) on the one immediately below it, and so descending in the following order — contralto, second contralto (if any), tenor, second tenor (if any), bass and, lowest of all, second bass (if any). A good musician is able to form a pretty close idea of the effects the composer intends to produce by carefully reading the score. See MUSIC.

SCOREL, Jan van. See SCHOOREL, JAN VAN.

SCORESBY, skōrz'bĭ, **William,** English Arctic explorer: b. Cropton, near Whitby, Yorkshire, 5 Oct. 1789; d. Torquay, Devonshire, 21 March 1857. He was the son of a whalefisher of the same name and made his first voyage with his father in the *Dundee* when but 10, and for eight years after 1803 they made annual voyages, young Scoresby studying at the University of Edinburgh between voyages. In May 1806 in the *Resolution* they reached the highest northern latitude (81° 30′) then attained. The elder Scoresby resigned his command of this ship in 1811 and was succeeded by his son, who continued the northern whaling expeditions and at the same time made observations of the electrical phenomena of the Arctic regions and it was through his reports that the government was induced to send out the Arctic expedition under Sir John Ross in 1817. In 1823 after 17 voyages to the Greenland and Spitzbergen regions he quit whalefishing, and several years later became a divinity student at Queens College, Cambridge. He was graduated in 1825, ordained in that year and subsequently held various livings and became well known for his philanthropic labors. He visited the United States in 1842 and in 1848, and made a voyage around the world in 1855–56 in the pursuit of magnetic researches. He published 'History and Description of the Arctic Regions' (2 vols., 1820); 'Journal of a Voyage' (1823); 'Discourses to Seamen' (1831); 'Magnetical Observations' (1839–52); 'Zoistic Magnetism' (1849); 'The Franklin Expedition' (1850); 'My Father: Being Records of the Adventurous Life of the Late William Scoresby, Esq.' (1851), etc. Consult his 'Life' by R. E. Scoresby-Jackson.

SCORODITE, a mineral occurring in small leek-green to reddish-brown quartzoid crystals of orthorhombic form associated with the arsenical minerals of Europe, Siberia, Brazil, Utah and many other localities. It is also found as a pale green incrustation around hot springs, occurring thus in Nevada and the Yellowstone Park.

SCORPÆNIDÆ, skôr-pē'nĭ-dē, a family of marine fishes, represented prominently by the California rockfish (q.v.).

SCORPIO, *in astrology* the "accursed constellation," the "false sign," ominous of war, discord and woe. It is of "watery triplicity," and is attended at its setting by tempests and by autumnal diseases.

In astronomy the eighth sign of the Zodiac, its symbol is ♏. The main star of this constellation is Antares, a red star of the first magnitude, which has a green companion of the seventh.

SCORPION, arthropod animals forming the order *Scorpionida* of the class *Arachnida* (q.v.), which also includes the spiders, mites, ticks, etc. Like all other *Arachnida* the scorpions possess eight legs; but they are distinguished from the spiders by the possession of a distinctly ringed elongated tail, terminating in a hooked claw or "telson," the outlet and sting of a poison-gland situated at its base. The tail consists of a broader anterior pre-abdomen of seven segments and a slender post-abdomen of five segments and the sting, and it merges gradually into the anterior cephalothorax. There are four pairs of walking limbs borne on the thorax, a pair of large chelate pedipalpi, with crushing jaws at their bases, and a pair of small chelate or nippered jaws or *cheliceræ*, corresponding to the crustacean antennæ. The genital ducts open on the basal segment of the pre-abdomen, the second segment bears a pair of comb-like sensory organs and the four succeeding segments each a pair of lamellate respiratory sacs opening by stigmata. The eyes are simple and usually consist of one pair of large ones with from two to five pairs of smaller ones.

The scorpions inhabit warm countries and some of the species of tropical Africa and South America reach a length of 10 inches. The females are said to exhibit great care for their young, and carry them on their backs for several days after being hatched, whilst they tend them carefully for about a month, when they are able to shift for themselves. Scorpions are active at night and by day live in dark places and under stones. The food consists chiefly of insects, which they seize by means of their chelæ, and sting to death. The sting is rarely fatal to man, that of the smaller temperate species not exceeding the sting of a hornet in severity, but it may prove dangerous to persons of weakly constitution. The poison is said gradually to lose its effect on man, so that the more frequently a person is stung the less noxious do the effects of the sting become. Painful effects follow the sting, such as nausea, swelling of the bitten part, etc. The remedies most to be relied upon appear to be ammonia, tobacco, ipecacuanha, etc., together with warm applications to the limb, and attention to prevent the spread of the virus, as by tying a ligature above the wound.

Among the 20 or more North American species are *Broteas alleni*, with six ocelli, of Lower California; *Vejovis carolinensis*, of the entire southern United States, with eight ocelli, and *Centrurus infamatus* of similar range.

The book-scorpions or pseudo-scorpions (*Pseudo-scorpionida*) are common small forms with short broad abdomen and no sting.

Consult Kraepelin, 'Scorpions and Pedipalpi' (Berlin 1899), and Banks, 'American Naturalist' (1900); Warburton, "Scorpions" in 'Cambridge Natural History' (Vol. IV, New York 1909).

SCORPION-FLY, a neuropterous insect of the family *Panorpidæ*, in which the head is prolonged to form a beak. The body is long and slender. The legs are long, the tarsi being five-jointed; and two spur-like processes exist in the tibiæ or shins. They have four, multiveined wings. The name Scorpion-fly is derived from the appendages attached to the abdomens of some species. In certain species the sixth and seventh joints of the abdomen are attenuated and capable of extensive motion; while the last joint forms a pair of forceps resembling those of the earwigs. When at rest this tail is curled over the back, but when irritated the forceps are used as weapons of offense or defense. These insects are found chiefly in damp situations, under bushes, etc.

SCORPION-SHELL, or **SPIDER-SHELL,** one of the strombs, so called from the projecting spines with which the shells are provided. The most familiar one (*Pteroceras lambis*) is a mottled chestnut, variegated with white and orange lines. Internally its hue is pale brown and yellow. Its length is three or four inches. The orange-mouthed scorpion-shell (*P. aurantias*) is creamy white outside and orange within, and its curved spines are white and glistening. These shells are chiefly found in the Indian and Chinese seas; and the genus *Pteroceras* is represented by many fossil species, beginning in the Liassic formations.

SCORPION-SPIDER, or **FALSE SPIDER,** a small spider-like arthropod allied to the scorpion, various species of which constitute the order *Pedipalpida*. The body consists of unsegmented cephalothorax and flattened abdomen of 11 to 12 segments. The *cheliceræ* are simple, the pedipalps simple or chelate, the first pair of legs terminate in a many-jointed flagellum. See ARACHNIDA.

SCORZONERA, a genus of composite plants with numerous species, chiefly indigenous to the Mediterranean regions. The flowers are yellow or rarely rose-colored, having many series of involucral bracts, plumose and unequal pappus, and achenes without a beak and generally wingless. *S. hispanica,* sometimes known as viper's grass, has long been cultivated for its tapering, fleshy, edible roots, the dark-brown skins of which have caused it to be called black salsify. The leaves are long and lanceolate with waving edges. Other species are also cultivated for their roots.

SCOT, skŏt, or **SCOTT, Michael,** a mediæval Scottish scholar and man of science: b. probably about 1175; d. probably about 1234. He is said to have studied at the universities of Oxford, Paris and Bologna. After a period in the service of Frederick II at Palermo, he continued his studies at Toledo, where he learned Arabic. On leaving Toledo he again repaired to Sicily, where he was closely associated with the Emperor Frederick, to whom he was appointed astrologer. He took orders, and was appointed by Honorius III to the archbishopric of Cashel in Ireland, but declined the post. He was at Oxford in 1230, probably sent by Frederick to bring before the university the translations of Aristotle made by himself and others. Scot was a scholar learned in the science of time, but has been transformed by legend into a magician. As such he is referred to by Dante ('Inferno,' canto xx) and Boccaccio ('Decameron'), and he plays a prominent part in the popular superstitions of the border districts of Scotland. Many works are attributed to him, of which the following have been printed: 'Liber Physiognomiæ Magistri Michaelis Scoti' (1477); a Latin translation of Aristotle's 'De Animalibus' (1496); 'Quæstio Curiosa de Natura Solis et Lunæ' (1622), on alchemy; and 'Mensa Philosophica' (1602), anglicized as 'The Philosopher's Banquet' (1614). Consult Brown, J. W., 'Life and Legend of Michael Scot' (1897); Sir Walter Scott's notes to 'Lay of the Last Minstrel.'

SCOT, Reginald or **Reynold,** English writer: b. Scotshall, Kent, probably about 1538; d. 1599. He was a student at Oxford, but returned home without taking a degree and devoted himself to the study of old and obscure mystical authors and the pleasures of gardening. The work on which his reputation is founded is entitled 'The Discovery of Witchcraft' (1584), and was directed against the belief in witchcraft, alchemy, astrology and other prevalent superstitions of his time. King James I ordered the first edition of the book to be burned by the common hangman, and attempted a reply to it in his 'Demonology.' Refutations were also published by Meric Casaubon, Joseph Glanvil and others.

SCOTCH FIR, or **SCOTCH PINE,** the only pine (*Pinus sylvestris*) indigenous to Great Britain, but common all over northern Europe, especially in Scandinavia. Trunks of it dating from prehistoric times have been found in peat-bogs. It has two leaves in each sheath, and ovate cones about as long as the leaves, with cone-scales terminating in a pyramidal recurved point. The cones reach maturity in the second year. Scotch firs sometimes attain the height of 120 feet, and although conical when young become picturesque in age, with gnarled, twisted boughs covered at the extremities with dense glaucous foliage and gathered into a mushroom-like head. The straight trunk, sometimes four feet in diameter at the base, has a bright reddish-brown bark, and a heart wood of the same color, which furnishes the lumber called deal, that is nearly as durable as oak. This is so valuable, especially for shipbuilding, that the Scotch pine is extensively planted; naval stores, also, are made from the abundant resin, and the sap-wood, while more perishable than the heart, is used for agricultural purposes, railway sleepers and paving blocks. The bark will serve for tanning.

SCOTCH or **SCOTS LAW,** the system of jurisprudence and judicial practice as developed in Scotland. Ancient Scotch law bore a marked resemblance to the law of England, but changes developed so that the two systems differed to a considerable extent as early as the end of the 16th century. Shortly before this the Court of Session, which had been established more than a century before, was abolished and another court, known as the College of Justice, was substituted. The system of legal procedure adopted by this court was modeled after the Roman law, and the judges showed a marked preference for Roman substantive law also. As a result the differences between Scotch and English law grew greater as time progressed, and although in recent years legislation has brought the legal systems of both countries more into harmony, there still exists considerable divergence in procedure, substantive law and terminology. For instance, the term "pursuer" as used in Scotch law is equivalent to "prosecutor" or "plaintiff" in English law. The pleading of the pursuer in criminal actions setting forth the material grounds of the action is called the "condescendence." Offenses are divided into two classes:

"delicts" and "quasi-delicts," nearly resembling torts in English law. Cases often occur in which it is almost impossible to differentiate between delicts and quasi-delicts. Scotch law divides property into heritable and movable, in marked contrast with English law, which divides it into real and personal. Contracts by the Scotch classification are divided into three classes: Real, consensual and quasi-contracts. A consideration is not essential to the validity of an unsealed contract. "Process" has a much wider application than in English law, being practically equivalent to "practice" or "procedure." In the law of sales, no distinction is made between conditions and warranties, and the statute of frauds has no application. The law of divorce differs considerably from that of England, the consent of parents not being essential to the validity of marriages of minors; an absolute divorce may be secured by either party for mere desertion (called non-adherence), as well as for adultery, in which latter case the parties may both remarry except with the paramour if mentioned in the decree. Formerly jurisdiction in divorce proceedings was vested in a body of commissaries, but by statute this was changed so that it now vests in the Court of Session.

In Scotland few crimes are constituted by statute, the common law being so construed that if a judge directs an act to be a crime and a jury convicts, such act is a crime. In the past this has served as an instrument of political oppression, but such is apparently not its effect to-day. The summons goes into considerable detail, and is regulated by the Act of 1850. The practice of including the grounds of the action in the summons has been discontinued, such grounds now being contained in the condescendence and pursuer's plea in law annexed to the summons. The usual form of accusation is by indictment drawn by the public prosecutor, and ordinarily a grand jury is impaneled in cases of treason only. Private prosecutions are rare. The old procedure by criminal letters has been abolished. A copy of the indictment, with a list of the witnesses, must be served on the defendant. An action in the Court of Session now commences with a summons by the pursuer. The statement of the defender is called his defenses. The procedure in this court was amended by the Court of Session Act of 1868. The pleadings in the Sheriff's Court are similar to those in the Court of Session, and the procedure is governed by the Sheriff Courts of Scotland Act of 1876. One of the distinctive characteristics of Scotch criminal law is the "not proven" verdict of the jury, which corresponds to the *non-liquet* of the Roman law, and which is permissible in certain cases. In legal effect it is equivalent to "not guilty," and bars any further action on the same charge, but it falls far short of an acquittal on the reputation of the defendant. Criminal procedure in Scotland was much simplified by an act passed in 1887.

The ordinary appellate tribunal in Scotland for decisions of superior courts and of the lords ordinary is the Court of Session, sitting in two divisions. In criminal cases appeals from inferior courts go to the Court of Session sitting in the High Court of Justiciary. Since the year 1707 the House of Lords has been the final appellate tribunal for Scottish civil causes, but has never acted in criminal cases.

The Court of Admiralty of Scotland was continued at the Union in 1707 for the determination of all maritime cases within the jurisdiction of that court, but in 1830 its civil jurisdiction was transferred to the Court of Session and the Sheriff's Court. The last-named court has also limited criminal jurisdiction.

Jury trials were first used in Scotland for certain forms of civil cases in the 19th century, but are not frequent to-day.

EDWARD F. DONOVAN,
Formerly Editor 'Unabridged Standard Dictionary,' 'Standard Bible Dictionary,' etc.

SCOTCH MUSIC. Much conjectural matter has been written about the origin of Scotch music, discussing, among other questions, whether it was the creation of one of the artist favorites of James III, or was brought over and naturalized by David Rizzio. That much of it is as old at least as the 16th century was proved by a manuscript collection of the tunes in a handwriting and notation which brought them close back to that period. This collection, known as the 'Skene Manuscript,' was edited by a man of scholarly attainments who had devoted himself to musical study — William Dauney, F.S.A., Scotland. His conclusions on their value as preserving the music of the country in its original purity are "The favorable contrast which many of the Scotch airs therein contained present to the dull, tiresome, meretricious productions which from time to time have been palmed off upon the public under that name, and the vitiated copies of the same tunes which have been handed down by tradition alone, are the most gratifying results of its discovery. We are now no longer at a loss for a standard by which we can test the genuineness of our national music, distinguishing the true from the false, the pure ore from all admixture of baser metal." One of the most prominent features of the Scottish music is the prevalent omission of the fourth and seventh in the scale, and the consequent absence of all semitones; another is the substitution of the descending for the ascending sixth and seventh of the minor scale. Modulation often takes place between the major key and its relative minor, and the melody keeps ever true to the diatonic scale of the principal key, no accidentals being introduced. Many airs open in the major key and close on the minor. Closes are not confined to the tonic, and are found on the third, fifth and sixth, and in Highland music on the second of a major and the seventh of a minor key. Consult Thomson, G., ed., 'Melodies of Scotland, with symphonies and accompaniments, by Pleyel, Kozeluch, Haydn, Beethoven, Hummel and Weber' (6 vols. 1793–1841); Graham, G. F., 'The Songs of Scotland,' and Fulcher, 'Lays and Lyrics of Scotland' (Glasgow 1870).

SCOTCH TERRIER. See DOG; TERRIER.

SCOTER, or SURF DUCK, a duck of the genus *Œdemia*, characterized by a broad short bill curiously swollen, bright-colored at the base of the upper mandible and with a hooked nail. These are the most marine of all ducks, though the American species may also occur about the Great Lakes, etc. They are comparatively weak fliers but expert divers and feed chiefly upon mollusks and other animals, for which they dive and grope in the mud of shallow waters. The males of all the species are uniformly velvety black, with or without white markings on the head and wings, and with bright colors on the bill. The females are plain brownish above, grayish below, with dull-colored bills. There are three common American species; the black scoter (*Œ. americana*), the white-winged scoter (*Œ. delandi*), and the surf duck or sea coot (*Œ. perspicillata*), and the European species occasionally wander into our territory. All of this species breed in the far North and winter within the United States as far south as New Jersey and Chesapeake Bay on the Atlantic and California on the Pacific side. A few may linger through the summer in Maine, etc.; and the second species is the most abundant. The flesh is unpalatable on account of its strong fishy taste; but this quality permits its being eaten by Roman Catholics on fast-days.

SCOTIA, skō'sha, N. Y., village in Schenectady County, on the north bank of the Mohawk River, three miles northwest of Schenectady, on the New York Central and the Boston and Maine railroads. It is situated in a dairying region and is chiefly a residential town. It was settled in 1758. Pop. 4,358.

SCOTIA SEMINARY, an institution for the education of Negro girls located at Concord, N. C. It was founded in 1880 under the auspices of the Presbyterian Board of Missions for Freedmen. There are four departments of study, the Normal and Scientific Department, the Grammar School, the Preparatory Department (elementary grade) and the Industrial Department. Instruction in music is also given; physical training and instruction in hygiene, principles of ventilation, etc., form a part of the curriculum. The normal course extends over two years and the scientific course continues one year longer and includes instruction in Latin, geometry, astronomy, rhetoric, civil government, nursing, mental science and ethics. Manual training is a part of the whole course; in the lower classes (Grammar Department); this training is given chiefly by the students doing the work in the boarding department; for the higher classes there are courses in cooking, household economy and sewing. No tuition is charged except for instruction in music; the institution is largely supported by the Presbyterian Board of Missions. The library contains more than 2,500 volumes. The students average 300; the faculty 20.

SCOTISM, the philosophical and theological system founded by Joannes Duns Scotus, toward the close of the 13th century and which in succeeding centuries was the greatest of the systems opposed to that of Thomas Aquinas. Scholastic philosophy was the philosophy of Aristotle interpreted, developed and reconciled with the Christian faith. In the latter part of the Middle Ages, scholastic theology, accepting the data of Catholic faith, occupied itself in arranging, defending and drawing deductions from them on the principles of scholastic philosophy. Of this scholastic philosophy and theology, there were two great schools, of which the Thomist found its home in the Dominican, the Scotist in the Franciscan, order. The Nominalist school found adherents in both of these orders and in the Church generally, but never exercised an influence like that of the older systems, and really marks the decay of Scholasticism as a whole. The principles of Scotism are stated in the 'Opus Oxoniense' and the commentary 'The Four Books of the Sentences,' written by Scotus at Oxford. His whole philosophical and theological teaching is here in collected form. Scotists no less than Thomists were, in the strictest sense of the word, scholastics. The one as well as the other, accepted the whole tradition of the Church as it was collected by Peter Lombard; to Scotus no less than to Saint Thomas the Pope is the supreme guardian and divinely instituted exponent of the deposit of faith left to the Church, the highest guide and ruler of the Christian commonwealth. Again Scotus, as well as Thomas, accepts Aristotle as the representative of human reason, the decisive authority in philosophical discussion. The Scotists were greater Realists than the Thomists. To the Thomists no universal exists as such. The essence is only actually found in the individual; it is by a process of the intellect — abstraction — that we separate humanity in general from humanity as it manifests itself in a particular man and reach the idea of man in general. To the Scotists the nature in all individuals of the same species was numerically one. The obvious difficulties of this theory led later Scotists to modify it till it was scarcely discernible from Thomism. The Scotists believed that in individuals there was an "Læcceitas," something which made them individual apart from matter; also "the created will is the total and immediate cause of its volition, so that God in respect thereto has no immediate but only mediate efficacy." The will is like a "free horse," grace like the rider, and the horse can throw its rider; otherwise, the will could not be free, and there would be no possibility of sin. Scotism denies the possibility of proving by reason the immortality of the soul; claims that the Word would have become man, even had there been no fall; that the merits of Christ were not infinite in themselves and from the union of his human nature with the Word, but only from the acceptation of them as infinite on the part of God. Consequently, the system denies the infinite value of the sacrifice of the Mass. The Scotist teaching in regard to the sacraments differed greatly from the Thomist position, admitting only a moral efficacy instead of the physical efficacy taught by the latter. Thomism denied the indifference of any deliberate action while the Scotists reject this reasoning, and hold that the end, and, therefore, the action, might be indifferent. The Scotist philosophy and theology are now abandoned but many of its opinions have been adopted. The Scotist opinion on the Immaculate Conception finally triumphed, and its theory on the Incarnation has recommended itself, as a philosophical view of that mystery, even to writers of note outside the Church. Consult Werner, 'Scholastik des späteren mittelalters' (Vol. I, Vienna 1881), from which this article is principally taken, 'The Catholic Encyclopedia' (New York 1910).

SCOTISTS. See SCOTUS, JOHN DUNS; SCHOLASTICISM.

SCOTLAND, skŏt'land, **UNITED KINGDOM,** the northern division of the island of Great Britain, extending between lat. 54° 38′ and 58° 40′ 30″ N., and long. 1° 46′ and 6° 8′ 30″ W. It is separated from England substantially by the Solway, Cheviots and Tweed, the border isthmus being about 60 miles across; but the irregular boundary line, the historic Border-land, measuring fully 100 miles. On all other sides it is bounded by the sea. The greatest length, from north-northeast to south-southwest, between Dunnet Head and the Mull of Galloway, is 287 miles. The breadth varies from 140 miles to less than 30, the latter in the north, between Dornoch Firth and Loch Broom. Few points in the mainland are more than 40 miles from the sea, the country being deeply penetrated by inlets. The country was formerly divided into a number of districts, many of the names of which are still familiar, such as Lothian, Tweeddale, Galloway, Breadalbane, etc., but for political purposes it is divided into shires or counties, as may be seen in the following table. Edinburgh (the capital), Glasgow, Dundee and Aberdeen each contain upward of 100,000 inhabitants. After these come, in order of population, Paisley, Leith, Greenock, Coatbridge, Kilmarnock, Kirkcaldy, Perth, Hamilton, Motherwell and Falkirk.

Islands and Coasts.— The islands of Scotland are said to number altogether nearly 800. On the east coast they are few and small; but on the northeast are the two large groups, the Orkneys and Shetlands, the former numbering 52 islands, 28 permanently inhabited; the latter 100 islands, 29 inhabited; while on the west coast the islands are large and numerous. Here the Hebrides (q.v.) extend for 200 miles from north to south, and are divided into the Inner and Outer Hebrides, the former lying close to the western coast of the mainland and stretching from Skye to Islay; the latter, parted from the Inner Hebrides by the straits of the Minch and the Little Minch, comprise the long chain of islands from Lewis to Benbecula. Enclosed in the Firth of Clyde are the islands of Arran, Bute and the Cumbraes, forming a county by themselves. The west coast of the mainland is generally a wild, deeply indented mountain-wall, presenting a series of inlets or sea lochs, while toward the middle the coast is cleft by two great inlets with openings to the southwest, the Firth of Lorn and its continuation Loch Linnhe, and the Firth of Clyde and its ramifications running far inland. The east coast is sometimes low and sandy, but is often formed by steep rocky cliffs of considerable elevation, the chief inlets being the Firths of Forth and Tay, and the Moray Firth, Cromarty Firth, etc.

COUNTIES	Area in square miles	Population, 1901	Population, 1911
Aberdeen	1,955	304,439	312,177
Argyle	3,213	73,642	70,902
Ayr	1,128	254,468	268,337
Banff	640	61,488	61,402
Berwick	460	30,824	29,643
Bute	217	18,787	18,186
Caithness	685	33,870	32,010
Clackmannan	47	32,029	31,121
Dumbarton	241	113,865	139,831
Dumfries	1,062	72,571	72,825
Edinburgh	362	488,796	507,666
Elgin or Moray	475	44,800	43,427
Fife	492	218,840	267,739
Forfar or Angus	875	284,082	281,417
Haddington	271	38,665	43,254
Inverness	4,088	90,104	87,272
Kincardine	383	40,923	41,008
Kinross	72	6,981	7,527
Kirkcudbright	897	39,383	38,367
Lanark	881	1,339,327	1,447,034
Linlithgow	120	65,708	80,155
Nairn	195	9,291	9,319
Orkney and Shetland	926	28,699 28,166	53,808
Peebles	354	15,066	15,258
Perth	2,527	123,283	124,342
Renfrew	245	268,980	314,552
Ross and Cromarty	3,078	76,450	77,364
Roxburgh	665	48,804	47,192
Selkirk	257	23,356	24,601
Stirling	447	142,291	160,991
Sutherland	2,027	21,440	20,179
Wigtown	485	32,685	31,998
Total	29,785	4,472,103	4,760,904

Orography.— From the configuration and geological structure the country divides into three divisions, the Highlands, Central Lowlands and Southern Uplands. The first of these divisions lies north of a line stretching in a southwesterly direction from the coast of Kincardineshire to the Firth of Clyde; the third is the country south of a line drawn from Dunbar southwesterly to Girvan; the country between these lines forms the Central Lowlands. The Highland division is remarkable for the number and elevation of its mountain-masses, many of the summits being over 4,000 feet high. The mountains best known by name are the Grampians, which form a system or series of masses covering a large area and culminating on the west coast in Ben Nevis, 4,406 feet high; while 55 miles to the northeast rises a remarkable cluster of summits reaching in Ben Macdhui the height of 4,296 feet. The Grampians and their connections are separated from the mountains farther to the north by Glenmore or the Great Glen of Scotland, a remarkable depression stretching quite across the country from sea to sea, and forming, by the series of lakes occupying it and the Caledonian Canal connecting them, a waterway from the west coast to the east. The Southern Uplands are also essentially a mountainous region, summits of over 2,000 feet being frequent, though none exceed 3,000 feet above the sea. The central region, though much less elevated than the other two divisions, has none of the monotony usual in flat countries. Though occupying not more than a sixth of the whole surface, the fertility of the soil and its mineral treasures make this part by far the wealthiest and most populous. The present form of the land surface of Scotland is the effect of erosion or denudation. The country was at one time an elevated table-land, the upper surface of which is indicated by the summits of the mountain-masses, but has been deeply trenched and furrowed in all directions by the erosive action of water, ice and frost. The slope of the ancient plateau is determined by the direction of the principal river; in the northern part it is chiefly toward the east, in the southern more equally east and west.

Hydrography.— The chief rivers flowing east to the German Ocean are the Tweed, Forth,

RAND McNALLY POPULAR MAP OF SCOTLAND SCALES

Statute Miles, 28 = 1 Inch.

Kilometers, 45 = 1 Inch.

Rand McNally & Co.'s New 11 × 14 Map of Scotland.
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IRELAND

NORTH CHANNEL

IRISH SEA

ENGLAND

ATLANTIC OCEAN

NORTH SEA

Passage of Sleat

Passage of Barra

Passage of Gigha

Passage of Islay

Passage of Scalpay

Passage of Scalpay

Sound of Jura

Sound of Islay

Sound of Mull

Sound of Harris

Sound of Barra

Sound of Eriskay

Sound of Sleat

Sound of Raasay

Sound of Skye

Sound of Scalpay

Sound of Scarba

Sound of Shuna

Sound of Kerrera

Sound of Gigha

Tay, South Esk, North Esk, Dee, Don, Deveron, Spey, Findhorn, etc.; those entering the sea on the west are the Clyde, Ayr, Doon, Dee, Nith, Annan and Esk. The Clyde in its lower course carries a vast traffic, this being rendered possible chiefly by dredging. Many of the rivers are valuable from the numbers of salmon they produce. A striking feature of the country is the great multitude of lakes varying in size from Loch Lomond (28 square miles) to the pool-like mountain tarns. In the Northern Highlands almost every glen has its lake and every mountain hollow is filled by a stream or spring. Among the more noted are lochs Lomond, Katrine, Tay, Earn, Rannoch, Awe, Shiel, Laggan, Lochy, Ness, Maree, Shin, in the Western and Northern Highlands; Loch Leven, in the Central Lowlands; and Saint Mary's Loch, lochs Ken, Dee and Doon in the Southern Uplands.

Geology.— The older or Palæozoic rocks predominate almost everywhere in Scotland. The Highlands are composed almost entirely of crystalline schists, gneiss and quartzites; the Central Lowlands of Old Red Sandstone, Carboniferous and Permian strata; the Southern Uplands mostly of rocks of Silurian Age. In certain localities remains of secondary formations are represented over small spaces, while volcanic rocks cover considerable areas. Granite exists in great masses in many localities, and in some parts is extensively quarried. The most valuable mineral region is the Central Lowlands, where coal and iron exist in such quantity as to make this one of the most important mineral fields of Great Britain.

Agriculture.— Oats form the prinicipal cereal crop, and is the only crop available on the moist oceanic border. Wheat is grown in the Lothians, Fife and the Merse of Berwick, where the average number of bushels to the acre is the largest in Great Britain. Barley, potatoes and roots are other crops of the east coast. The average crop of roots in Scotland amounts to half that of England. Important fruit-growing districts are the Carse of Gowrie and around Blairgowrie and Coupar-Angus. The mountain pastures of the Southern Uplands and the Lower Highland hillsides support sheep. Notable breeds of cattle are the Ayrshire, a dairy breed, black-polled Aberdeen, Angus, a beef stock, West Highlanders and black-polled Galloways. Clydesdale is the originator of a famous breed of horses. The average acreage under crops is about 5,100,000 acres. The yield of oats in 1917 was 41,321,568 bushels, barley, 9,103,204 bushels; turnips and swedes, 8,000,000 long tons; potatoes, 1,000,000 long tons. There are about 8,000,000 sheep in the country and about 1,000,000 cattle. In 1916 there were 76,754 holdings, of which 2,558 contained over 300 acres, 23,227 from 50 to 300 acres, 32,985 from 5 to 50 acres, and 17,984 from 1 to 5 acres.

Mining.— The mineral region of Scotland is the Central Lowland. The largest coal fields lie in Lanarkshire, which produces over 40 per cent of the total output, Ayrshire, Fife, the Lothians and Stirling. The iron fields lie near the coal, in the counties of Ayr, Lanark, Linlithgow, Renfrew, Fife, Midlothian and Stirling. Oil shale is mined round Edinburgh and Linlithgow. Other important mineral products are the red and gray granite of Aberdeenshire, limestone, found principally in Fife and Midlothian; slate of Argyll and Perth; and lead, fire-clay, etc. Coal production in 1917 reached 35,596,800 tons; oil shale, 3,000,000 tons; iron, 675,000 tons. The total value of all mineral products in the same year was $106,320,000.

Manufactures.— The most important industries are those of textiles, metals and machinery, and shipbuilding. Glasgow is the chief seat of all industries. The cotton industry centres chiefly in Glasgow and Paisley, the latter being noted for its thread. The woolen manufacture is settled in Stirling, Kilmarnock, Bannockburn and Paisley, while the wool produced on the Southern Uplands, combined with the presence of water as a motive-power, has helped to locate the manufacture of woolen cloths in the Tweed-Valley towns of Hawick, Galashiels and Selkirk. The linen industry first began in Forfarshire, at Glamis, in 1790, and has since remained in several Forfar towns, such as Dundee, which also specializes in jute, Arbroath, Brechin and Forfar. In Fife, Dunfermline specializes in damask, and Kircaldy in linoleum, Airdrie, Coatbridge, Falkirk, Kilmarnock and Hamilton smelt and work iron. Glasgow turns out machinery of all descriptions, and Kilmarnock makes locomotives and rolling-stock. Shipbuilding centres in Glasgow, Port Glasgow, Greenock, Patrick, Govan and Dumbarton. This industry is also pursued to a smaller extent on the east coast. A special quality in the water has in each case assisted in developing paper manufacture in Midlothian, while Edinburgh, next to London, is the greatest printing centre in the United Kingdom, and in Aberdeenshire, whisky distilling and dyeing at Perth and Dumbarton are important industries. Sugar-refining and tobacco manufacture are carried on at Glasgow. The annual value of the output of the textile factories is about $200,000,000. Shipbuilders before the war turned out an average of 500 vessels annually, aggregating about 900,000 tons. During the war this production was vastly increased but the censorship rendered it impossible to give the production figures. The war also greatly affected the production of distilled spirits, which formerly reached the staggering annual total of about 25,000,000 gallons. This has been greatly curtailed.

Commerce.— The indented coast of Scotland and its deep inrunning estuaries have greatly favored the development of commerce, as has the fact that the producing areas on the Central Lowland are either actually on or quite close to the maritime outlets. The western ports trade chiefly with America, the west of England and Ireland; the eastern ports chiefly with the Netherlands, Hamburg and the Baltic. The commercial connection with Ireland and the West is shown by a large import into the Clyde ports of bacon, ham, grain, flour, tobacco, livestock, leather, lard, timber, iron ore. Representing foreign imports in the eastern parts are butter, grain and floor, eggs, linen, yarn and timber, all principally from Russia and other Baltic countries. The exports in either case are identical in character with British exports generally. The value of all imports is about $275,000,000 annually and the exports reach about the same amount, although

the latter have been greatly curtailed during the war. See GREAT BRITAIN — COMMERCE.

Communications.— Railway lines reach Edinburgh and Glasgow from the south by skirting round the Southern Uplands through the eastern edge of plain-land, and, by means of river valleys, penetrating the heart of the Southern Uplands themselves. While the flat country between Edinburgh and Glasgow has made railway construction easy. Northward, connection from Glasgow and Edinburgh is provided by the North British Railway, which crosses the Forth and Tay by two magnificent bridges, and runs along the flat coastal sill to Aberdeen, whence the Great Northern of Scotland carries it on to Elgin and to Inverness. Another north route is by the Caledonian Railway, which enters Strathmore through the gap between the Campsie Falls and Ochils, and continues through Perth and Forfar, to the coast at Montrose, whence it runs on to Aberdeen. The Highland Railroad from Perth penetrates up the valley of the Tay and of the Garry to Inverness, whence it continues north to Wick and Thurso. The total railway mileage is 3,871. Scotland possesses three canals. The Caledonian connects the nearly continuous line of lochs which fill Glenmore, and is used principally for tourist traffic, as is the Crinan Canal across the peninsula of Kantyre. A deep depression secured the construction of the Forth and Clyde Canal (1790) between Bowling and Grangemouth.

Finance.— The Scottish fiscal system is part of that of the United Kingdom. Scotland's annual contribution to the revenues is about $100,000,000, made up of the excise tax, income tax, estate dues, customs, land taxes, etc. The non-tax revenue from postal, telegraph and telephone service amounts to about $14,000,000 yearly. See GREAT BRITAIN — NATIONAL FINANCES.

Population.— In 1801 the official census showed the population numbered 1,608,420. In the following half-century it had increased to 2,888,742, and in 1901 it stood at 4,472,103. In 1911 it reached 4,760,904, and the estimate for 1915 was 4,785,598. Of these 75 per cent live in towns of 1,000 or more inhabitants; about 8 per cent are non-Scots, mostly Irish and English. Previous to the war about 50,000 emigrated annually to the colonies and the United States.

Fisheries.— Both the freshwater and sea fisheries of Scotland are important, especially on the eastern coast. Aberdeen is the chief fishing centre; others are Peterhead, Wick, and, on the west coast, Stornoway. The chief food fishes are herring, especially those of Loch Fyne; haddock, flat fish, notably Forth flounders, and cod. In recent years sail-boats have been superseded by motor-boats and steam-fishing vessels. About 100,000 are employed in the industry; the value of the catch in 1917 exceeded $20,000,000.

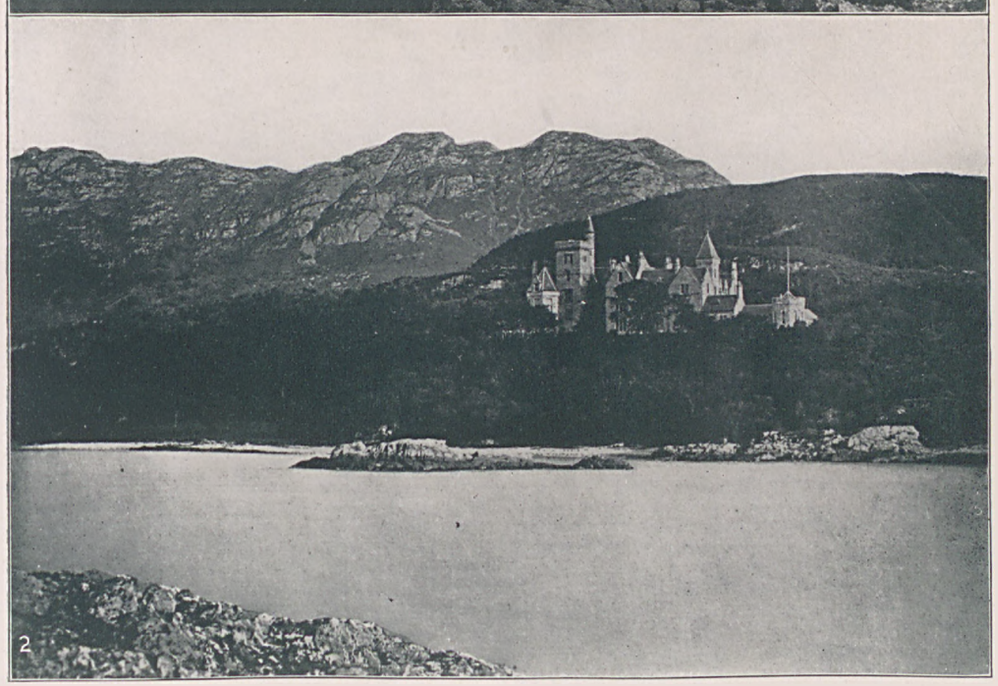
Religion.— The strongest religious body in Scotland is the Presbyterian, the established branch of which has a membership of about 725,000 distributed among 1,450 churches. The second largest religious body is the Roman Catholic with 525,000 adherents, next comes the United Free Church of Scotland with 510,000 members. The Episcopal Church is represented by about 54,000 members.

Political Constitution.— The Parliament of Scotland anciently comprised, till the reign of James VI, all who held any portion of land, however small, from the Crown by tenure of military service when the small barons or freeholders were excused from attendance in person, "two or more wise men" being deputed from each county in proportion to its size. Its powers were nominally extensive, but the supreme power was virtually in the king, who by his influence often entirely controlled its proceedings. The Parliament on the whole consisted of three estates — the nobility, the dignified clergy (consisting of bishops, abbots and priors), and the lesser barons, or representatives of shires and burghs. When Presbyterianism was formally ratified by law after the Revolution of 1688, the ecclesiastical estate ceased to have a place in Parliament. Every measure brought before Parliament was previously prepared by a committee, styled the lords of the articles, chosen from each of the three orders, but in effect little better than royal nominees. Before the Union there were four great officers of state — the lord high-chancellor, the high-treasurer, the lord privy-seal and the secretary; and there were also four lesser officers — the lord clerk-register, the lord-advocate, the treasurer-depute and the justice-clerk. Previously to the era of the revolution the Privy-Council of Scotland assumed inquisitorial powers, and even torture was administered under the sanction of its authority; but it is now entirely merged in the privy-council of Great Britain. The number of peers in the Scottish parliament was latterly 160, and of commons 155, and all sat in one house, and voted promiscuously. At the union of the kingdoms the political system of Scotland was almost entirely incorporated with that of England. See GREAT BRITAIN — PARLIAMENT.

The Court of Session is the supreme civil court of Scotland. The Court of Justiciary, or criminal court, composed only of judges of the Court of Session, is supreme in the highest sense, since its decisions in criminal cases are not subject to any review. The principal subordinate judicatories are sheriff-courts, established in each county or stewartry. Sheriff-substitutes, or judges ordinary, one or more holding separate courts in different districts, decide in the first instance, subject to the review of the principal sheriff or sheriff-depute, whose decisions, though final within the limits of his jurisdiction, are reviewable by the Court of Session, with the exception of classes of cases provided for by special statutes. Besides the Sheriff-Court, each county or district of a county has its justice of peace courts, in which judges, not stipendiary, decide on principles of equity in minor crimes; and in every town of any importance are bailie, dean of guild and police courts, with limited jurisdictions.

Education.— Scotland has had a national system of elementary education for over two centuries, a school having been established in every parish by a law of 1696 (where such a school was not already established), according to a system proposed by John Knox long before. This scheme did effective service for the education of the people, till the great increase





1 Fingal's Cave

2 Duncraig Castle, Loch Carron

of population, especially in towns, rendered it unequal to the task laid upon it, and this was notwithstanding the erection of many schools by various religious denominations. By the Elementary Education Act of 1872 the Scottish Education Department was instituted, and each burgh and parish or group of parishes was required to have a school board to administer both elementary and secondary schools. Elementary education is compulsory between the ages of 5 and 14, with exemption, on conditions, for children over 12. In 1889, by a capitation grant, education was made free for the compulsory standards. In 1897 provision was made for grants in aid of voluntary schools. In 1916, 3,369 schools were in receipt of grants; these had an enrolment of 1,106,240 and an average attendance of 752,566. There are also numerous grammar or high schools and academies in every town of any size, though no systematic scheme of secondary education. Other institutions are the normal or training schools and colleges of the different religious bodies, and four universities of Edinburgh, Glasgow, Aberdeen and Saint Andrews. The first university was that of Saint Andrew, dating from 1411; next came that of Glasgow (1450), then King's College and University Aberdeen (1494), then Edinburgh University (1582), lastly Marischal College and University Aberdeen (1593). The two Aberdeen universities were united in 1860. In board-schools now education is practically free.

Civil History.—The country now called Scotland emerges from pre-historic obscurity during the Roman occupation of Britain, though for many centuries little is known of its history. It is supposed that the earliest inhabitants of the country were a non-Aryan race resembling the Iberians, and typified now by the Basques. A Celtic (and Aryan) people seem subsequently to have entered the country, and to have gained predominance over the non-Aryans, the combined people occupying at the Roman invasion most of the country north of the Forth and Clyde estuaries, which was called Caledonia (q.v.) by the Romans, and its people Caledonians. The southern part of the country was inhabited by another Celtic race, the Brythons or Britons, of the same blood as the Welsh. The descendants of the Caledonians were afterward called Picts, and were the predomiant people in North Britain at the beginning of the 6th century, when a colony of Scots or Dalriads from Ireland effected a settlement in Argyll, and gradually spread over the adjacent regions. It is from these Scots (a Celtic and Gaelic-speaking people) that the country afterward received the name of Scotland, the original Scotland (Scotia) being Ireland. The Pictish tribes were divided into two great sections, the Piccardach or Southern Picts, and the Cruithne or Northern Picts. In the 9th century the Dalriadic Scots with the help of the Cruithne conquered the Southern Picts, but the Northern Picts, the ancestors of the modern Highlanders, still retained their independence. The Teutonic element was introduced into Scotland as early as the 4th century, when bands from North Germany seem to have formed settlements on the east coast south of the Firth of Forth; and this part of the country was subsequently united to the Anglian kingdom of Northumbria, which extended from the Forth to the Humber. To the west of this kingdom, from Dumbarton to the Solway and into England, extended the kingdom of Strathclyde or Cumbria, inhabited by Romanized Britons.

About the middle of the 9th century Kenneth MacAlpin, son of a ruler of a body of Scots established in Galloway, but of Pictish descent through his mother, united in his own person the sovereignty of both the Picts and the Scots. The Norsemen had already established a footing on the islands of the north and west coasts as far south as the Isle of Man, and a Norse earldom of Orkney was established. Kenneth's kingdom comprised Central Scotland (Argyle, Perth, Angus, Mearns and Fife), with Scone as capital, the north of Scotland being mostly under independent chiefs, or maormors. The reigns of Kenneth and his immediate successors, Donald I, Constantine I, Grig, Donald II, Constantine II, Malcolm I, Kenneth II, Malcolm II, Duncan and Macbeth, were one continued warfare with the Norsemen on one hand and with the Britons of Strathclyde and the English of Northumbria on the other. Malcolm I (943–954) obtained Cumbria (Strathclyde) as a territorial fief from Edmund I, and in 1018 his grandson, Edmund II, secured Lothian, hitherto part of Northumbria, two events which materially influenced the after history of Scotland.

On the advent of Malcolm Canmore (1058) to the throne after the death of Macbeth, the able usurper and murderer of Duncan (see MACBETH), the purely Celtic monarchy came to an end.

The conquest of England by William of Normandy, the usurpation of the English throne by Stephen, and various other incidents of English history embroiled Scotland. Sir William Wallace (q.v.) distinguished himself in disputing the claim of Edward I to the throne of Scotland and Robert Bruce securing the independence of the country and his title to the throne by the decisive battle of Bannockburn in 1314. He was succeeded by his nephew, Robert Stewart, and he by his eldest son, Robert. He being a weak prince, the reins of government were seized by the duke of Albany, who starved to death the eldest son of the king. James, the second son, to escape a similar fate, fled to France; in the year 1424 he returned to Scotland, and having excited the jealousy of the nobility, he was assassinated in a monastery near Perth. James II, his son, an infant prince, succeeded him in 1437. He was killed by the bursting of a cannon at the siege of the castle of Roxburgh. James III ascended the throne at the age of seven years. His reign was weak and inglorious, and he was murdered in the house of a miller, whither he had fled for protection. James IV, a generous and brave prince, began his reign in 1488. He was slain at the battle of Flodden. James V, an infant of less than two years of age, succeeded to the Crown. He died in 1542, and was succeeded by his daughter, the celebrated Queen Mary, whose history and tragical end are well known (see MARY STUART). She was succeeded by her son James, who, in 1603, ascended the throne of England, vacant by the death of Queen Elizabeth, when the two kingdoms were united into one great monarchy which was legislatively

united in 1707. A joint commission was appointed to draw up articles of union in 1706. The Scottish Parliament met to consider the articles, which encountered a strong opposition headed by the duke of Hamilton, and strongly backed up by the bulk of the people. A majority of the parliament, however, carried the measure, 16 Jan. 1707; it received the royal assent 4 March; and the Union took effect 1 May. The chief provisions of the Act of Union were (1) that the two kingdoms should be united under the name of "Great Britain"; (2) that the succession to the crown of the United Kingdom should be in the Electress Sophia of Hanover and her heirs, being Protestants; (3) that 16 Scottish peers and 45 Scottish members of the House of Commons should be elected to the one parliament sitting in London; (4) that the Established Presbyterian Church of Scotland should be maintained; (5) that Scotland should keep unchanged her own laws and customs relating to property and private rights, and also the Court of Session and other Scotch courts; (6) that all the rights of trade, free intercourse and citizenship should be the same for Scotch and English subjects. Henceforth the general history of Scotland may be said to be entirely identified with that of England.

For further information see articles under GREAT BRITAIN — SCOTTISH HISTORY; THE CONQUESTS; MEDIEVAL ENGLAND; THE REFORMATION; THE XVIITH CENTURY; THE XVIIITH CENTURY; THE XIXTH CENTURY; PARLIAMENT; CROWN AND CABINET; THE JUDICIAL SYSTEM; LOCAL GOVERNMENT; THE CIVIL SERVICE; NATIONAL FINANCE; BANKING; COMMERCE; SHIPPING; RAILWAYS; AGRICULTURE; FISHERIES; MINING; RELIGION; EDUCATION; ARMY; NAVY, ETC.

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SCOTLAND, Church of. See DISCIPLINE, BOOKS OF; PRESBYTERIANISM.

SCOTLAND, Language and Literature of.

I. Language.— Previous to 1400, the term "Scottis," i.e., Scottish or Scots was used in Scotland exclusively to refer to Gaelic, the language of the Celtic inhabitants of the north and west; the speech of the Lowlands being then and for a century later known as English, of which it was in fact a dialect. But after 1500 it became common to speak of the Lowland tongue as "Scots," distinguishing it on the one hand from the English of the south of the Tweed, and on the other from Gaelic, which had come to be known as "Erse." In the first part of the 16th century, this Lowland Scots practically achieved the dignity of a separate national language; and though to-day its place has been taken by English in the schools, the courts, the pulpit, the press and in cultivated society, it is still, though corrupted and broken into a score of local dialects, the speech of the humbler classes in the Lowlands.

As to origin, "Scots" is in the main a development of Northumbrian, the Teutonic language spoken by the Anglian settlers in the region between the Humber and the Forth. Of the steps in this development previous to the 13th century we have, for that part of Northumbria lying north of the Tweed, little direct evidence; and when finally we find, about the beginning of the 14th century, undoubted Scottish documents, the language differs little if any from what is known as Northern Middle English. This indentity is natural enough when we remember that the boundary between the kingdoms had been for centuries a shifting one, the border counties being now English, now Scottish. But after the present frontier was virtually settled, the wars over Scottish independence, the chronic estrangement which they produced between the two kingdoms and the political alliance with France, all combined to produce conditions which made probable a separate linguistic development for Scotland; so that by 1450, when the Midland dialect had practically driven all others out of the literary field in England, "Scots" (now called Middle "Scots," as distinct from the previous stage of Early "Scots" was in a fair way to independence. The flourishing of a national literature in the years between 1475 and 1550 aided this development; and in spite of the great influence of Chaucer, Gower and Lydgate, the northern tongue reached in the first half of the 16th century its point of greatest dissimilarity to English. The basis of the language remained, of course, the same as that of English, except that it was from the Northumbrian form of the parent speech that it was derived. The inflections had tended to disappear earlier in the Northern than in the Midland dialect, larger admixtures of Norse and Celtic had taken place, and, though English had absorbed more French, Scots had received independently many French words not found in the south. There was, besides, in the Scottish writers of the 16th century a strong tendency to import words direct from the Latin, and we find, especially in the courtly style of the period, a large number of barely naturalized Latinisms that found no permanent home in the vernacular.

Had nothing arisen to disturb the detachment of the two kingdoms, it seems likely that a sister language to English would have been established in the north, with distinct qualities of vigor, music and picturesqueness of its own. But the effect of the Reformation was to enable England to displace France in Scotland's foreign relations; and the influence of Protestant England on the speech of the Scottish pulpit was greatly strengthened by the acceptance in Scotland of English translations of the Bible. These forces, which have continued to work in Scotland to the present day, soon accustomed the common people to the use, if not of pure English, at least of a highly Anglicised form of Scots; and while supplying the peasantry with a polite dialect for purposes of religion and intercourse with the gentry, left the national language, now devoted to more homely uses, to become a mere patois. The moving of the Court from Edinburgh to London at the Union of the Crowns in 1603 still further accentuated the change, both by deciding that English was to be the language of high society throughout Britain, and by making clear to Scottish men of letters that, if they were to reach the larger audience, they must cultivate the language of "the predominant partner."

Thus passed the possibility of a real national language for Scotland. Various attempts to restore it were made from time to time, and with the intellectual revival in Scotland in the 18th century, Allan Ramsay, Fergusson, and finally Burns, turned once more to the vernacular as their medium of expression. But it was a greatly changed vernacular. The century and a half of the domination of English in matters of culture had reduced its scope, and broad "Scots" could be maintained only in the treatment of a limited range of subjects. Even into these, English and semi-English forms constantly intruded, and anything like a pure descendant of the pre-Reformation "Scots" of Lindsay and Douglas it is impossible to find. Though the old tradition, impoverished as it was, was valiantly upheld by Burns, and turned to artistic uses with amazing success, yet with Burns the account is practically closed. He has had many imitators; other authors of Scottish birth have written in the dialect; but we are not again to have a "Scots" writer using the old tongue as his normal literary medium. The race of the "makars" is ended, and the dialects into which the old speech has disintegrated have crept into corners to die.

II. Literature.— Few vestiges of the earliest writings in "Scots" have survived. Some fragments of patriotic verse have come down from the troublous times following the death of Alexander III, but the earliest name is that of Thomas the Rhymer of Erceldoune, a shadowy figure long regarded as a prophet. He seems to have flourished in the end of the 13th century, and is himself the hero of the romance of 'Thomas of Erceldoune.' His name is connected with the Northern romance of 'Sir Tristram'; but no general agreement has yet been reached as to the probability of his authorship. The poem itself is a paraphrase from the French, written in an elaborate stanza but without great poetic distinction. Somewhat later than Thomas, but hardly less shadowy, is another supposed writer of romance, Huchown of the Awle Ryale, who, according to Wyntoun,

> "Made the gret gest off Arthure
> And the Awntyre off Gawaine,
> The Pystyll als off Swete Swsane."

The last of these is easily identified with a version of the story of Susanna and the Elders, written in a difficult stanza with interlacing rhymes and alliteration. But the relation of the extant poems on Arthur and Gawain to those mentioned by Wyntoun is a puzzle yet unsolved, as is also the identity of Huchown himself, whom some have found in a certain Sir Hew of Eglintoun, who died in 1375. Practically all the anonymous Northern romances have been assigned to Huchown; but the absence of criteria of dialect sufficient to place these poems definitely on either side of the border makes it difficult to decide which, if any, of them should be regarded as Scottish literature.

With the author of 'The Bruce' we come out into clear daylight. John Barbour (?1320–95) was in 1357 already Archdeacon of Aberdeen, and we have record of his employment in clerical offices about the royal household. 'The Bruce,' on which he was at work in 1375, is a celebration of the life and exploits of Robert I, written in the octosyllabic couplet and in the general manner of the metrical romances. It contains much history and some — it is uncertain how much — fiction. The poet was contemporary with many who knew Bruce, and it is more than probable that much of his material was derived from eye-witnesses of the events related. His work is raised above the level of mere chronicle by the warmth of his patriotism and hero-worship and by the vividness of occasional sketches of character and incident. To the same author have been attributed fragments of a poem on Troy and a collection of saints' legends, but neither ascription is now believed to be valid.

Barbour's patriotic task was carried on in the beginning of the next century by Andrew of Wyntoun (fl. 1395–1424) in his long and uninspired 'Orygynalle Chronykil,' a history of Scotland in octosyllabic couplets, from the creation of the world to the reign of James I. A third poem with patriotic purpose is 'The Wallace,' usually attributed to Henry, a blind minstrel who flourished in the latter half of the 15th century. It is stated by the historian John Major (b. 1469) that this Henry, blind from birth, composed a book on Wallace when Major was a boy; but the manuscript of the extant 'Wallace' has no reference to Henry, and it is highly doubtful whether this is the poem alluded to by Major. Our 'Wallace' is a long poem in the heroic couplet, which claims to be based on an alleged Latin work by an unknown John Blair. It is fiercely patriotic in tone, highly unreliable as history, and full of incredible accounts of feats of the hero against the hated English. It is the chief source of the legends of

Wallace on which the patriotism of Scottish children is still fed, and in a modernized version, made by Hamilton of Gilbertfield in 1722, it continued popular into the 19th century. It is probably the earliest poem in Scots to employ the heroic couplet.

The influence of Chaucer occasionally discernible in 'The Wallace' had already made itself evident in Scotland in 'The Kingis Quair' of James I. This is a beautiful example of the conventional love-allegory of the Middle Ages, written in the seven-line stanza of Chaucer, and in a form of Scots greatly modified in imitation of Chaucer's English. The heroine is apparently Lady Jane Beaufort, whom James married at the close of his captivity in England; but precise autobiography should not be sought in an allegory. There is no more charming specimen of this type of love-poem in any English dialect; and the romantic character and tragic death of its royal author have combined with its poetic quality to give it a unique place.

Contemporary with Blind Harry was the most versatile and original poet Scotland had yet known, Robert Henryson (?1425–?1506), schoolmaster in Dunfermline. His greatest single achievement is 'The Testament of Cresseid,' a continuation of Chaucer's 'Troilus.' Here in some two hundred stanzas of rhyme royal he tells of the poetic justice which overtook Cressida. The poem is smooth in versification, tender in feeling, splendidly dramatic in its treatment of the great monuments of the story, and, though less subtle in psychology than Chaucer's masterpiece, more rapid in narrative. Henryson's 13 'Fables' are the first considerable collection of the kind in any English dialect. Though the stories themselves belong to the general tradition of fable literature, they are told here in a greatly expanded form, with abundant local color, much invention of vivid detail, shrewd interpretation of character, and a lively sense of humor. In 'Robene and Makyne' Henryson appears as the first importer of the pastoral. Though the situation and names are familiar in French literature, the treatment is such as to make the little piece thoroughly Scottish. In addition to the works enumerated, Henryson wrote a number of religious and contemplative poems leaving altogether a body of work small in bulk, but surprising in its variety, originality and its higher imaginative level. There is no poet in our literature whose merits so far surpass his reputation. Probably also belonging to the 15th century are some poems whose date is difficult to fix on account of the fact that they are preserved only in a late form. Of these, 'Rauf Coilyear' is a lively offshoot of the Charlemagne cycle; and 'Peblis to the Play' and 'Christis Kirk on the Green,' rollicking pictures of rustic revelry, have been ascribed to both James I and James V.

Early Scottish poetry is generally regarded as having reached its height in William Dunbar (?1460–?1520). Most of Dunbar's life was spent about the court of James IV, where he remained in the hope, never fulfilled, of receiving a fat benefice. He wrote in two styles which may as a rule be fairly easily distinguished. In the one, his «aureate» style, are composed his courtly allegories, complimentary addresses, and devotional poems; in the other, his satirical and humorous poems. The aureate style is laden with Latin words of the type of «celsitude» and «pulchritude,» often coined for the occasion; and the versification, especially in its rhyme schemes, is often very elaborate. Among the most notable in this style is 'The Goldyn Targe,' a prettily worked-out allegory of the Court of Love type, differing from the mass of poems of its kind chiefly by the firm hold kept by the poet on the psychological signification of his symbols and personifications. 'The Thrissil and the Rois' belongs to the same class, and celebrates the marriage of James IV to Margaret Tudor. Of the poems written in the broader vernacular, the most extreme is the 'Flyting' with Andrew Kennedy, a contemporary poet who has left but a few poems besides his share in this duel. The poem belongs to the class of scurrilous invective common in Italy during the Renaissance, and is coarse and revolting beyond expression. Equally strong in vernacular flavor is 'The Dance of the Sevin Deidly Synnes' a vividly grotesque picture of the lower world. Dunbar's 'Dregy' is of the familiar mediæval type of the parody upon religious services, and is carried out with more humor than reverence. The many poems on abuses in the court, the sessions, and the Church, lose interest for the modern reader on account of the ephemeral nature of their themes; but both these and the devotional poems habitually exhibit technical mastery. Perhaps the greatest single achievement of Dunbar is 'The Lament for the Makars,' a stately and melancholy chant written in time of sickness, lamenting the mortality of the race of poets. It is in four-line stanzas, each concluding with the sombre Latin refrain, 'Timor mortis conturbat me.» Belonging to the older tradition of unrhymed alliterative verse, 'The Twa Merrit Wemen and the Wedo' is a cynical but extremely lively and indecorous sketch, probably inspired by the Prologue to Chaucer's 'Wife of Bath's Tale.' The most notable quality of Dunbar's work in point of content is its reality, the sense of immediate contact with life; in point of form, the quite extraordinary variety and skill shown in the versification, and the brilliance and point of the diction.

Gavin Douglas (1475–1522) was the third son of Archibald, Earl of Angus. Like Dunbar, he was a churchman, but of far different fortunes. Provost of Saint Giles in Edinburgh and later Bishop of Dunkeld, he was led by his family connections into various political and diplomatic activities, and the fall of his house from power led to the loss of his bishopric and his exile. He died in London of the plague. His 'Palice of Honour' is the most elaborate specimen of the allegory in Scots, and it exhibits most of the vices of its kind. It abounds in descriptions of pagan deities in procession and of wonderful gardens and castles, written in fluent verse decorated with copious «aureate» terms; and the classical element is varied by a suffusion of Catholic theology and morality. But the style lacks fire, and the allegory itself is rambling and incoherent. 'King Hart,' the ascription of which to Douglas is usually though not universally accepted, is a shorter production of the same general type, more directly didactic in aim, but also much clearer in conception. But Douglas's fame depends chiefly upon his translation into heroic couplets of the 12 books of the 'Æneid,' with the addition of the supplementary book by Maphæus Vegius, and original prologues to each book. The work is notable as the first complete translation of a classical poem into verse in Britain, and is in itself no small achievement. Some of the prologues are remarkable for highly realistic descriptions of nature, in which the «catalogue» method is carried to an extreme.

The last notable figure of the group carries us down almost to the date of the Scottish Reformation. Sir David Lindsay of the Mount (1490–1555) became attached to the royal household while still a young man, apparently as some kind of entertainer; and in 1512 he was appointed attendant to the infant King James V. Later he was knighted and made Lyon King at Arms, an office which carried with it, besides heraldic and diplomatic functions, the supervision of court fêtes. His poetry begins with 'The Dreme' (1528), an allegorical vision in rhyme royal, combining science with the exposure of contemporary abuses. 'The Complaynt to the King' (1529) presents a request for reward in the manner of Dunbar, recalls the poet's early intimacy with the king, and criticises his advisers. 'The Testament and Complaynt of our Soverane Lordes Papyngo' (1530) contains much political matter and some very frank satire on the priesthood. 'An Answer to the Kingis Flyting' shows Lindsay engaged in a political altercation with his master, scarcely less scurrilous than that between Dunbar and Kennedy. Satire on the court appears also in the 'Complaynt of the Kingis auld Hound'; 'The Jousting between Watson and Barbour' ridicules a mock tournament between two court physicians; the 'Deploratioun of the Death of Queen Magdalene' is an official production on conventional lines; 'Kittcis Confession,' an amusing attack on the Confessional; 'Ane Supplicatioun againis Syde Taillis,' a witty if coarse satire on feminine fashions. 'The Tragedy of the Cardinal' (1547) is a virulent attack on Cardinal Beaton, lately murdered. 'The Historie of Squire Meldrum,' the freest of his poems from satire or didacticism, is a narrative of the martial and amorous adventures of a contemporary laird, modeled on the mediæval metrical romance, and exhibiting a lighter touch and more charm than anything else of Lindsay's. His last work, the 'Dialogue concerning the Monarchie' is a long and tedious production dealing with the history of the world and the kingdoms thereof from the Creation to the Day of Judgment. But by far the most important of his works is his 'Satyre of the Thrie Estaitis,' a vigorous Morality with interspersed Interludes, satirizing the various abuses under which Scotland suffered, with special stress on the corruption of the clergy, and offering abundant advice to the king, before whom it was acted in 1540. From this enumeration of his works it will have appeared that Lindsay was much more a reformer than an artist. But his vigor and sincerity, his earnestness and outspokenness, not only made him a powerful force in the overthrow of the Catholic Church in Scotland, but enabled him alone of the pre-Reformation poets to remain popular in the following centuries. Over 50 editions of his works, in whole or in part, have been issued since his death.

In spite of the absorbing interest of religious controversy, there existed a group of poets in Scotland in the second half of the 16th century who wrote on other themes. Alexander Scott (1547–84) is almost exclusively a love-poet; and his 36 surviving pieces exhibit such technical skill in versification and so much genuine lyrical power as to make him, in this respect, the most worthy predecessor of Burns. Alexander Montgomerie (?1540–?1610), his disciple, worked under the further influence of that movement in English poetry which is represented by Tottel's 'Miscellany,' as is seen by the frequency of the sonnet among his verse-forms. He seems to have invented the peculiar 14-line stanza, imitated by Ramsay and Burns, known by the name of the first poem written in it, 'The Banks of Helicon.' His more popular poem, 'The Cherry and the Slae,' is in the same form; and he experimented largely in other stanzas. His chief subjects were love, nature and religion; and he added one more to the list of Scottish flytings. More interesting than the work of the minor writers of the period such as Maitland, Sempill and James VI is the book of 'Gude and Godlie Ballates,' a remarkable collection of Protestant verses, many of them violently controversial, written to the tune and often parodying the words of popular secular songs, and intended for purposes of propaganda. Most of them are ascribed to James and John Wedderburn, whose brother Robert wrote anti-Papist plays.

Of literature in vernacular prose, Scotland has little to boast. Most of that written before 1600 is translation, the most important being the anonymous 'Complaynt of Scotlande.' This curious work was written by a strong partisan of the French as opposed to the English alliance, and the scheme of the allegory on which the political part of the work is based is adapted from 'Le Quadrilogue Invectif' of Alain Chartier. More original than this serious setting forth of the woes of Scotland and their remedies is an inserted 'Monolog Recreative' containing a mass of curious description, with lists of popular songs, tales and dances, used by a group of shepherds. The works of Knox and his followers and opponents belong to religious controversy rather than to literature; and most of the writings of George Buchanan (q.v.), the great Scottish humanist, were in Latin. Through the whole period so far discussed flourished the traditional Ballads (q.v.), which vie in interest and value with the works of the known authors.

In the period following the Union of the Crowns, the most important men of letters such as Sir Robert Aytoun, William Alexander, Earl of Stirling and Drummond of Hawthornden, wrote in English. One family, the Sempills of Beltrees, kept up the vernacular tradition, and Sir Robert (?1595–?1660) revived in 'The Life and Death of Habbie Simson' the six-line stanza which has come to be the recognized vehicle for Scottish elegy. Most of the songs of this period are anonymous, but the names of Lady Grizel Baillie, Lady Wardlaw and Hamilton of Gilbertfield show that the dialect could still be written by the upper classes. Hamilton is the chief link between the Sempills and Allan Ramsay (1686–1758), whose work both as a poet and as a collector marks the definite revival of the vernacular. Ramsay first a wig-maker and then a bookseller as well as a poet, and we owe much to his enterprise in issuing his two collections, «The Tea-Table Miscellany» con-

taining songs old and new, Scots and English, and 'The Evergreen,' selections of Scots verse, chiefly from the Bannatyne manuscript. He wrote himself many songs, tales and fables, his most popular work being the pastoral drama, 'The Gentle Shepherd.' The corruption of the later Scots is abundantly exemplified in Ramsay's diction; and the substance and tone of his poems suffer from an analogous defect in the mixture of Scots and English influences. Yet his songs were undeniably popular; he had some gift of comedy and satire; and he gained through his pastoral a prominent position in that field. As an editor he helped to preserve older poetry which might otherwise have been lost, and to revive interest in the national literature; but his methods were those of his time, and he amended and "improved" ruthlessly.

Ramsay's activity was followed by the production of many good songs by a variety of writers, but none of the importance of Robert Fergusson (1750–74), a youth of genius, whose career in too many respects foreshadowed that of Burns. He sought relief in conviviality from the drudgery of a clerkship, fell a victim to religious melancholy, and died mad at 24. In his Scots verse Fergusson carried on the national tradition both as to language and versification, and displayed gifts not only of wit and humor but of genuine poetry, and a sense of style much surpassing Ramsay's. In his poems Burns found inspiration and models for some of his most popular productions; and he has left in poems like 'Auld Reekie' a vivid picture of the Edinburgh of his day.

In the achievement of Robert Burns (q.v.) Scottish poetry reached its climax and virtually its conclusion. A few poets whose lives overlapped his have been hailed by their respective admirers as his successors. Joanna Baillie (1762–1851) wrote some good humorous songs; Caroline Oliphant, Baroness Nairne (1766–1845), sang with poignancy the pathos of the lost Jacobite cause; and James Hogg, the Ettrick Shepherd (1770–1835), her rival in Jacobite lyric, attempted a much more ambitious task in 'The Queen's Wake.' Two at least of the poems in this composite and uneven work are worthy of remembrance, the delicate and charming "Kilmeny," and the weirdly humorous "Witch o' Wife." Many song-writers must be left unmentioned here. Scott, Stevenson and their successors wrote occasional vernacular lyrics and introduced vernacular dialogue into their novels, but the day for the spontaneous and complete use of Scots as a medium of expression by Scottish men of letters is past.

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SCOTT, skŏt, **Austin,** American college president: b. Maumee, Ohio, 10 Aug. 1848. He was graduated from Yale in 1869, and later became private secretary to George Bancroft, the historian. After serving as instructor in German at the University of Michigan, and associate professor in history in Johns Hopkins, he assisted Bancroft in collecting and arranging material for his 'Constitutional History.' In 1883 he was called to Rutgers College, where he taught in the departments of history and political economy until he became its president in 1890–96, when he again assumed his professorial duties. He died 16 Aug. 1922.

SCOTT, Charles, American soldier: b. Cumberland County, Va., 1733; d. 22 Oct. 1813. He served under Braddock in 1755 as a non-commissioned officer, and at the outbreak of the American War for Independence he raised and commanded the first company raised south of the James River. He was promoted colonel in 1776, was prominent at the battle of Trenton in 1777, and was promoted brigadier-general. He served in the two subsequent New Jersey campaigns, and under Gen. Anthony Wayne at Stony Point in 1779. He was taken prisoner in 1780 and was held until nearly the end of the war. He then settled in Woodford County, Va., and later saw service in Indian wars. He served under General St. Clair in 1791 and under General Wayne at the battle of Fallen Timbers later in the same year. In 1808–12 he was governor of Kentucky.

SCOTT, Charles Felton, American electrical engineer: b. Athens County, Ohio, 19 Sept. 1864. He was graduated at the Ohio State University in 1885, and later studied at Johns Hopkins University. He was engaged as an electrical engineer in 1888–1911, since when he has been professor of electrical engineering at the Sheffield Scientific School, Yale.

SCOTT, Clement, English author and journalist: b. London, 6 Oct. 1841; d. 25 June 1904. He was educated at Marlborough College and became widely known as a dramatic critic to the *Daily Telegraph* in 1873. Previous to his editorship of *The Free Lance* he was a well-known writer upon the staff of the *Sunday Times,* the *Weekly Dispatch,* the London *Figaro,* and other publications of note, and in 1880 became the editor of the *Theatre,* a London magazine. While not a great dramatic critic, he became a leader of popular opinion in things theatrical. He was the author of 'Lays and Lyrics'; 'Thirty Years at the Play'; 'From the Bells to King Arthur'; 'The Wheel of Life'; 'Madonna Mia,' and 'The Drama of Yesterday and To-Day'; 'Sisters by the Sea'; 'Ellen Terry.'

SCOTT, David, Scottish painter: b. Edinburgh, 10 Oct. 1806; d. there, 5 March 1859. He early determined to become a painter, and began by drawing vignettes and frontispieces for books. In 1827 he formed an association with some artists, who founded the Life Academy for the study of the living model. The following year he exhibited his first picture, 'The Hopes of Early Genius Dispelled by Death.' 'The Combat of Fingal with the Spirit of Lodi,' 'Sarpedon Carried by Sleep and Death,' 'Monograms of Man,' and other works painted between 1828 and 1832 indicated the wild and incoherent character of his genius, and the numerous large canvases which he filled with tireless industry and enthusiasm quite failed in producing the effect he anticipated, his pictures being grandly conceived, but wanting in color and finish. In 1841 he exhibited what has generally been considered his greatest picture, 'Vasco de Gama Encountering the Spirit of the Storm at the Cape,' which was subsequently purchased for the Trinity House at Leith. His whole career was an arduous struggle, not with absolute failure, but with a success far from adequate to his aspirations, and he must be looked upon as the Scottish counterpart of Haydon.

SCOTT, Dred, American negro slave: b. Missouri, about 1810; d. after 1857. See DRED SCOTT CASE.

SCOTT, Duncan Campbell, Canadian poet: b. Ottawa, Ontario, 2 Aug. 1862. He was educated at Stanstead Wesleyan College, and entered the Canadian civil service in 1879, becoming chief accountant in 1893. Besides his contributions of verse to the current periodicals, he has published in verse 'The Magic House' (1893); 'Labour and the Angel' (1898); 'New World Lyrics and Ballads' (1905); 'Via Borealis' (1906), and in prose, 'The Village of Viger,' a collection of stories (1896); 'John Graves Simcoe' (1905), in the 'Makers of Canada' series.

SCOTT, Eben Greenough, American author: b. Wilkesbarre, Pa., 15 June 1836. He was graduated from Yale in 1858, and is the author of 'Interstate Law of Pennsylvania'; 'Development of Constitutional Liberty,' and 'Reconstruction During the Civil War.'

SCOTT, Fred Newton, American educator and authority on English: b. Terre Haute, Ind., 20 Aug. 1860. He was graduated at the University of Michigan in 1884, and has since been associated with the faculty of that university, becoming professor of rhetoric there in 1901. He was university editor in 1897–1900. He edited many classic and standard works, is joint author of 'Guide to the Literature of Æsthetics' (1890); and of numerous textbooks on the English language. Author of 'Æsthetics, Its Problems and Principles' (1890); 'Principles of Style' (1890), etc.

SCOTT, SIR George Gilbert, English architect: b. Gawcott, near Buckingham, 13 July 1811; d. London, 27 March 1878. While still a youth he was placed by his father in the office of an architect, where his tastes drew him mainly to the study of Gothic architecture. The Martyrs' Memorial, erected at Oxford in 1841, was the first work which brought him into notice. It was followed by the new church at Camberwell, and in the same year he was the successful competitor for the rebuilding of the church of Saint Nicholas at Hamburg, which had been destroyed by fire. Among his other designs are included the cathedral church of Saint John's, Newfoundland; Glasgow University; Leeds Infirmary; chapels at Exeter College, Oxford, and Saint John's College, Cambridge; the Memorial to the Prince Consort, London; Saint Mary's Cathedral at Edinburgh, etc. Toward the close of his life he was engaged in carrying out the restoration of the cathedral at Saint Albans. Among the restorations accomplished by him are those of many English cathedrals. He was the author of 'Plea for the Faithful Restoration of Our Ancient Churches' (1850); 'Conservation of Ancient Architectural Monuments' (1864); 'Lectures on the Rise and Development of Mediæval Architecture' (1878); 'Personal and Professional Recollections' (1879).

SCOTT, Harvey W., American editor: b. Tazewell County, Ill., 1 Feb. 1838; d. 7 Aug. 1910. He removed to Oregon in 1852, and in 1865 became editor and chief owner of the Portland *Oregonian.* He made that newspaper the leader among the Pacific Coast papers, while his sturdy independence of policy and clear, forceful writing made him as an editor a political power. The *Oregonian* stood for the gold standard in the election of 1896 and Scott had the satisfaction of seeing Oregon carried by the Republicans, the only Pacific Coast not registering its vote against the gold standard.

SCOTT, Hugh Lenox, American military officer: b. Danville, Ky., 22 Sept. 1853. He was graduated from the United States Military Academy 14 June 1876 and was commissioned second lieutenant 15 June 1876; first lieutenant 28 June 1878; captain of cavalry 24 Jan. 1895; major and assistant adjutant-general, United States Volunteers, 12 May 1898; lieutenant-colonel and assistant adjutant-general, United States Volunteers, 17 Aug. 1899; major 25 Feb. 1903. Served in Sioux expedition, 1876; Nez Percé expedition, 1877; Camp Robinson, Nebraska and Cheyenne expedition, 1878; subsequently performed routine duty, principally with the Indians of the Plains, 1878–91; honorable mention from War Department, 1891; in charge investigation of Ghost Dance disturbances, 1890–91; enlisted and commanded Kiowa, Comanche and Apache Indians, troop L, seventh cavalry, 1892, until mustered out after five years' enlistment (last Indian troop mustered out); in charge of Geronimo's band of Chiricahua Apaches, 1894–97. On duty at Bureau of Ethnology, Smithsonian Institution, writing work on sign language, Plains Indians, North America, November 1897, until outbreak of Spanish War. He served as adjutant-general of Second and Third Divisions of First army corps, May 1898 to February 1899; adjutant-general, Department of Havana, under General Ludlow, March 1899, to May 1900; adjutant-general of the Division of Cuba until November 15, when the Division of Cuba was changed to Department of Cuba; adjutant-general of Department of Cuba 1900–02, and acting governor-general of Cuba; took part in turning over the government of Cuba to the Cubans, 20 May 1902; was on duty with General Wood winding up the affairs of the Military Government of Intervention in Cuba, 1902. He served in the Philippines, 1903–06, in the establishment of civil gov-

ernment, as governor and commander of troops in Sulu Archipelago; the conquest and pacification of the Sulu Archipelago and brought about the abolishment of slavery and the slave trade therein.

On 31 Aug. 1906, he was appointed superintendent of the United States Military Academy, with rank of colonel, and served as such until 31 Aug. 1910. On 3 March 1911, he was commissioned lieutenant-colonel of cavalry, and on 18 Aug. 1911, he reached, in due course of promotion, the rank of colonel, and was assigned to command of the Third cavalry. In November 1911, he was sent by the Secretary of War on a special mission to New Mexico and Arizona to adjust Indian troubles; on 23 March 1913 was promoted to rank of brigadier-general. During year April 1913 to April 1914, he commanded the United States troops on southern border from Texas to California, at time of our difficulties with Mexico. On the breaking out of severe troubles with the Navajo Indians on Beautiful Mountain, Arizona, November 1913, he was sent there with four troops of cavalry and was so successful in settling a difficult situation that he received the commendation of both the President and the Secretary of War. On 22 April 1914, he was appointed assistant chief-of-staff, and on 17 November of same year became chief-of-staff. In January 1915 he settled by diplomacy the impending conflict on the Mexican border at Naco, Arizona. In March 1915, he settled the Piute Indian trouble at Bluff, Utah. On 30 April 1915 he was promoted to rank of major-general. In August 1915, he was sent down to the Mexican border on a special mission, and was successful in recovering property of foreigners in Mexico confiscated by General Villa. In 1917 he was a member of the United States Commission to Russia and on 26 Dec. 1917 was made commander of the 78th Division of the National Army at Camp Dix, Wrightstown, N. J. In March 1918 he was made commander of Camp Dix. In 1910 he received the L.H.D degree from Princeton University, and in 1915 the LL.D. degree from Columbia College. General Scott is a member of the Geological Society of America, American Anthropological Association, Historical Society of Texas, Historical Society of North and South Dakota, Society of Moro Campaigns, Society of American Wars, Military Order of Foreign Wars, and Society of the Spanish-American War. He is author of various monographs and reports relating to the Plains Indians.

SCOTT, Hugh Stowell, English novelist, known by the *nom-de-plume* "HENRY SETON MERRIMAN": b. Newcastle-on-Tyne, 1862; d. Ipswich, 10 Nov. 1903. He was a short while in business, made numerous sea voyages, finally devoted himself wholly to literature, and from the appearance of his novel 'The Phantom Future' in 1889 wrote a long series of somewhat melodramatic works of fiction, particularly successful when dealing with Russia and Nihilistic plots. His best book was perhaps 'The Sowers' (1896). Others are 'Suspense' (1890); 'With Edged Tools' (1894); 'Flotsam' (1896); 'Roden's Corner' (1898); 'The Isle of Unrest' (1900); 'The Vultures' (1902).

SCOTT, John Morin, American soldier and legislator: b. New York, 1730; d. there, 14 Sept. 1784. He was graduated at Yale University in 1746, and engaged in practice in New York. He was an early supporter of American rights against the British Crown, was one of the Sons of Liberty and an advocate of extreme measures. He was a leading member of the New York General Committee in 1775, and a delegate to the Provincial Congress in that year, In 1776 he was appointed brigadier-general in the Continental Army, and he participated in the battle of Long Island. He was secretary of State for New York in 1777–79, and served in Congress in 1780–83.

SCOTT, Julian, American artist: b. Johnson, Vt., 14 Feb. 1846; d. Plainfield, N. J., 4 July 1901. He entered the Northern army in 1861 and while in service made his mark by his sketches of hospital life. He entered the National Academy, New York, in 1863, and subsequently studied under Emmanuel Leutze. He became an associate of the Academy in 1871. His pictures are largely scenes of army life, such as 'Rear-Guard at White Oak Swamp' (1869–70), owned by Union League Club; 'Battle of Cedar Creek' (1871–72, at the State-house, Montpelier, Vt.); 'Battle of Golding's Farm' (1871); 'The Recall' (1872); 'On Board the Hartford' (1874); 'Duel of Burr and Hamilton' (1876); 'Reserves Awaiting Orders' (1877); 'In the Cornfield at Antietam' (1879); 'Charge at Petersburg' (1882); 'The War is Over' (1885); 'The Blue and the Gray' (1886); 'Death of General Sedgwick,' in the Plainfield (N. J.) Public Library.

SCOTT, Levi, American Methodist Episcopal bishop: b. Odessa, Del., 11 Oct. 1802; d. there, 13 July 1882. He was chiefly self-educated, was licensed as a local preacher in 1826 and in 1834–36 he was presiding elder of the Philadelphia Conference. He was principal of the Dickinson Grammar School in 1840–42, and was connected with the Methodist Book Concern, New York, in 1848–52. In 1852 he was elected and ordained bishop.

SCOTT, Orange, American clergyman: b. Brookfield, Vt., 13 Feb. 1800; d. Newark, N. J., 31 July 1847. He entered the New England Conference of the Methodist Episcopal ministry in 1822; was presiding elder of the Springfield, Mass., district in 1830–34, and of the Providence, R. I., district in 1834–35. From 1833 he was a zealous anti-slavery worker, and failing to receive the support of his bishop he withdrew from the Church in 1842. In 1843 he organized the Wesleyan Methodist Church at Utica, N. Y., becoming its president. He was editor of the *True Wesleyan,* an anti-slavery and anti-episcopal publication, in 1842–44. Failing health compelled his retirement from the ministry in 1846. Author of 'An Appeal to the Methodist Episcopal Church' (1838).

SCOTT, SIR Richard William, Canadian statesman: b. Prescott, Ontario, 24 Feb. 1825; d. Ottawa, 23 April 1913. He was admitted to the bar in 1848; was mayor of Ottawa in 1852; was elected a member of the Canadian assembly in 1857–63, and of the Ottawa assembly in 1867–73, where he was speaker in 1871–73. He was also member of council and commissioner of the Crown lands of Ottawa in 1871–73. He was a member of the Dominion Senate from 1874, and was Secretary of State in 1874–78 and again in 1896–1908. He secured the enaction of the separate school act for the province of Ontario, and the Canadian temperance law known as the "Scott Act." He was knighted in 1909.

SCOTT, Robert Falcon, English naval officer and Antarctic explorer: b. Outlands, Devenport, 6 June 1868; d. Antarctic regions, 29 March 1912. He was educated at Stubbington, Fareham, and entered the navy in 1882. He become interested in Antarctic exploration and in 1900 after his promotion to commander he began preparations for his first exploring tour. In 1901–04 he commanded the Royal Geographic Antarctic Expedition, discovered Edward VII Land and reached the farthest point south then penetrated, lat. 82° 17', long. 163°. Returning in 1904 his achievements were highly acclaimed. He was appointed naval assistant to the First Lord of the Admiralty in March 1909 but resigned later in that year to make preparations for his second journey of exploration in the Antarctic regions. He set out in 1910 on the *Terra Nova,* and established headquarters at MacMurdo Sound late in that year. (See ANTARCTIC REGIONS — *Exploration*). With four others in the party making the last part of the journey he reached the South Pole 18 Jan. 1912, after the longest sledge journey ever made, 1,842 miles. Here awaited him the bitter disappointment of the discovery that Amundsen had gained the Pole five weeks earlier. Scott photographed the tent surmounted by the Swedish flag left by Amundsen and carried with him the letter to King Haakon according to the request left by his victorious rival. Scott's observation placed the pole only one-half mile from the point selected by Amundsen, and he planted the British flag there, made the necessary observations and set out upon the return journey. From the first ill-fortune dogged them; two of the party succumbed while Scott and the other two reached a point but 11 miles from One Ton Base and 155 miles from MacMurdo Sound on 20 March, with provisions for two days. They were held there by a blizzard and all died of hunger and exposure 29 March. Scott wrote in his diary until the last day, completing his records and leaving letters to the families of his companions, his own family, friends and officers, all stamped with matchless spirit. His observations of the expedition were in excellent order and of high scientific value. These and his diary were later published in the same style as his account of the first journey. The bodies of Scott, Wilson and Bowers were recovered in the spring of 1913. The officers of the navy contributed the funds for a bronze monument of Scott executed by his wife — who after his death was by Royal order known as Lady Scott — at Waterloo Place, London, in 1915. Author of 'Voyage of the Discovery' (2 vols.. 1905); 'Scott's Last Expedition' (posthumous, 2 vols., 1913).

SCOTT, Robert Kingston, American soldier and governor: b. Armstrong County, Pa., 8 July 1826; d. Napoleon, Ohio, 13 Aug. 1900. He studied medicine and engaged in practice in Henry County, Ohio, in 1851–57, later entering the mercantile business. In 1861 he was commissioned lieutenant-colonel in the 68th Ohio regiment, and in 1862 he was promoted colonel. He took part in the campaigns in Tennessee and Mississippi, and was commissioned brigadier-general of volunteers 12 Jan. 1865. He was assistant commissioner of the Freedman's Bureau in South Carolina in 1865–68 and was elected governor of South Carolina in 1868 and in 1870. He was charged in 1871 with being party to a fraudulent overissue of State bonds, but cleared himself and defeated the movement to impeach him. His administration was further complicated by the activities of the Ku-Klux-Klan, which compelled him to appeal to President Grant for United States troops to put down the disorder. He removed to Napoleon, Ohio, upon retiring from office, and in 1880 he shot and killed Warren G. Drury, but was acquitted on the grounds that it was accidental.

SCOTT, Thomas, English Anglican clergyman and Bible commentator: b. Braytoft, Lincolnshire, 4 Feb. 1747; d. Aston Sandford, Buckinghamshire, 16 April 1821. Possessing a strong love for learning he obtained a wide knowledge of both Latin and Greek, and in 1773 took orders in the Church of England. Through his friendship with John Newton he became an ardent Calvinist, defending Calvinism both in the pulpit and in the public press. He was chaplain of the Lock Chapel, London, in 1785–1801, and was then appointed rector of Aston Sandford, where he remained until his death. His reputation rests chiefly on his 'Commentary on the Bible' (1788–92), of which it is estimated that 100,000 copies have been sold. His other publications include 'The Force of Truth' (1779); 'Remarks on the Bishop of Lincoln's Refutation of Calvinism' (1812), etc. His collected 'Theological Works' were published (5 vols., 1805–08; 10 vols., 1823–25).

SCOTT, Thomas Alexander, American railway manager: b. London, Pa., 28 Dec. 1824; d. Darby, Pa., 21 May 1881. He entered the service of the Pennsylvania Railroad in 1850; became its general superintendent in 1858, and its vice-president in 1859. His services as superintendent of all government railroads and telegraph lines at the beginning of the Civil War placed him in the ranks of men of extraordinary ability, from which he was appointed Assistant Secretary of War in August 1861. This post he resigned in the following June, but re-entered the government service later and achieved distinction in the rapid construction of railroad lines necessary to the relief of General Rosecrans at Chattanooga. Again entering the service of the Pennsylvania Railroad, he inaugurated the policy of securing control of Western railway lines for the purpose of operating them in conjunction with the Pennsylvania lines. From 1874–80 he was president of the Pennsylvania and at various times of other lines.

SCOTT, Sir Walter, Scotch poet and novelist: b. Edinburgh, 15 Aug. 1771; d. Abbotsford, 21 Sept. 1832. He was the ninth child of Walter Scott, a writer to the Signet (lawyer), who belonged to the strenuous Border clan of Buccleugh, and of Anne Rutherford, a representative of another famous family. There were 11 other children, six of whom died in infancy. Walter at the age of 18 months suffered from spinal meningitis which caused a permanent

lameness of his right leg. On account of this he was early sent to the country, where he learned to love nature. Later his imagination was impressed by a journey to Bath and London. At the age of seven he was entered at the school in Edinburgh, where he displayed a love of sport and of good reading, though no great aptitude for hard, systematic study. For a short time he was at school at Kelso, where he formed his friendship with James Ballantyne. All accounts show that he was a manly, attractive boy who loved stories, poems like 'The Faërie Queene,' ballads and family legends.

In November 1783 he entered the University of Edinburgh, where his course was impeded by illness and his desultory habits were not overcome. His knowledge of the classics was slight, but he learned something of the chief Romance literatures and, while riding or walking for his health, he laid the foundations of his immense stock of antiquarian learning. In 1786 he was apprenticed to his father and, strength having come to him, he developed systematic habits of labor. He attended law lectures and debating clubs and in 1792 was called to the bar; but his interest in literature and history was no less than it had been, and he enjoyed the convivial society of his fellow law students. Despite his lameness, he was tall, strong, athletic and manly in appearance, full of life and merriment, and attractive to both sexes. An early attachment to a pretty young woman was to be expected, but impediments presented themselves and Scott was left with memories which bore witness to what is thought to have been "the strongest passion of his life."

His early work at the bar did not interfere with his making excursions into the Highlands and along the Border, which added to his stock of ballads and legends and gave him an extraordinary insight into the character of his countrymen. The life with which he came in contact had its seamy side, especially with respect to intemperance, but his was a romantic temperament that was not to be contaminated. A new interest also came to him in 1792, when, with his friend William Erskine, he began to study German. A few years later he attempted a paraphrase translation of Bürger's 'Lenore,' which he was persuaded to print along with another imitation of a ballad by the same author. This led to an introduction to "Monk" Lewis (q.v.), who brought about the publication in 1799 of Scott's translation of Goethe's 'Götz,' and persuaded his young friend to write some more ballads. Having thus had a taste of the pleasure of writing and publishing, though his success was far from dazzling, the young lawyer made plans to have his collection of ballads printed by his friend Ballantyne.

Meanwhile, his income from his profession had increased, and he had fallen in love with the attractive daughter of a French refugee, Charlotte Mary Carpenter (Charpentier). She had a small income settled on her, so that marriage did not seem a rash step. They took it in December 1797 and lived together congenially, although it does not appear that she was a specially qualified helpmate. In 1799 Scott was appointed sheriff-depute of Selkirkshire with a salary of £300 and few duties. Soon after, he prosecuted with energy the task of editing and publishing his important 'Minstrelsy of the Scottish Border,' the first two volumes of which appeared in 1802, the third in 1803. This contained some imitations of the old ballads, but fortunately did not include a narrative poem on the legend of Gilpin Horner, that was at first intended for it. The excluded poem, written in the free measure of 'Christabel' which a friend had recited to Scott, was slowly elaborated into 'The Lay of the Last Minstrel,' which was published early in 1805 and achieved great success. Here the creative genius of Scott first manifested itself in marked powers of narration, characterization and description, though scarcely in what may be called the strictly poetic gifts of high imagination, inevitable phrasing and noble harmony.

He now determined to follow literature seriously, but also to secure a more definite income than could be had from that or from his not specially brilliant work at the bar. With this end in view he undertook to perform the reportorial duties of an infirm clerk of session, who was to keep the emoluments of the office till his death or, as it turned out, until he was pensioned. Six years later (1812) Scott came into the comfortable salary of £1,300, but he had given much time to the clerkship and had done in addition work that would have worn out any less herculean constitution. He took some interest in politics, became a partner in James Ballantyne's printing business, proposed publishing schemes, wrote articles and edited books, working early in the morning, took rides (especially when he was at his beautiful home of Ashestiel near Selkirk), answered correspondents faithfully and yet found time for reading and study. There is scarcely another such energetic and copious genius of a high order in several spheres to be found in the annals of English literature.

His most important creative works during this period were 'Marmion' (1808) and 'The Lady of the Lake' (1810), which increased his fame as a poet; but they represent only a small part of his labors. He edited 'Dryden' in 18 volumes (1808), prefixing an elaborate biography; he superintended a new edition of the 'Somers Tracts' in 13 volumes, to say nothing of about eight smaller undertakings of a similar kind; he helped to establish *The Quarterly Review*, and he formed an unlucky partnership with John Ballantyne, brother of James, to conduct a publishing business. If they could have confined themselves to publishing Scott's poetry, even after the unenthusiastic reception of 'Rokeby' (1813) showed Scott that he could not successfully rival Byron and that his own talents must be exercised in another sphere, the partners, despite John Ballantyne's unbusinesslike habits, might have made a passable success; but Scott thought himself a born promoter and literary adviser, and he was generous to a fault with authors who were his friends. Miss Seward's works, Beaumont and Fletcher's plays edited by Weber, *The Edinburgh Annual Register* and other undertakings fell so flat it seemed best in 1813 to wind up the publishing business.

These difficulties were tided over by loans and by the transfer of more or less worthless books to the publisher Archibald Constable, and the success of the "Waverley" novels for some years made Scott feel more confident of his financial position than a prudent man should have felt. His was, indeed, a glorious genius

with a splendid energy to match, but he had also costly tastes which he aspired to gratify on a magnificent scale. His social position meant much more to him than his fame as a writer, and to maintain and increase that position he thought that he must acquire large estates and dispense a profuse hospitality. He began to realize his dream in 1812 when he bought the small farm of Abbotsford. Then he added one piece of land after another until he had spent about £30,000; he built himself a castle, and he lived on a scale which, in view of his tangled affairs, even his large income did not justify. It was only the discovery of his incomparable gifts for prose romance that his financial ruin was postponed for so long.

Early in July 1814, just after the edition of Swift in 19 volumes marked the culmination of Scott's career as an editor though not as a critic, the romance 'Waverley, or 'tis Sixty Years Since,' an anonymous story dealing with the period of the Young Pretender, made its appearance and took the novel-reading world by something like a storm, six editions being needed before the close of the year. Scott had begun the tale as far back as 1805, the year of the "Lay," but Erskine and James Ballantyne, who wanted another well-paying poem, discouraged his attempt, and the easy-tempered author put it aside. In 1808 his attention was again directed to historical fiction through the fact that he undertook to prepare for the press an unfinished romance by the antiquary Joseph Strutt, entitled 'Queenhoo Hall.' He had always had a faculty for narrative and had enjoyed the tales and novels of others, especially, in recent years, the Irish stories of Miss Edgeworth (q.v.). We have already seen that the comparative waning of his poetic fame before that of Byron — illustrated by the failure of 'The Bridal of Triermain' (1813) which was anonymous, and to be confirmed later by the reception of 'The Lord of the Isles' (1815) and of 'Harold the Dauntless' (1817) — led him to think that he must transfer his energy to other fields, and he would probably have tried prose fiction again, sooner or later, even if a famous accident had not recalled his early attempt to his mind. One day at the end of 1813, while searching for some fishing tackle, he found the manuscript of his forgotten tale in a drawer. He read it over and determined to complete it. This time Erskine had the good sense to approve his friend's experiment, and Scott, writing with his phenomenal steadiness and rapidity, finished the last two-thirds of the book in three weeks. He did not put his name to it, partly for fear of losing some of his reputation if it failed, partly because novels were still looked upon in the main as an inferior form of literature in which a dignified officer like a clerk of session would not be expected to dabble.

Of course his fears proved to be ill-founded and there was no necessity for his preserving his anonymity, but he seems to have liked the mystery involved, and perhaps he thought that by remaining "The Great Unknown" he appeared to be less of a professional man of letters and in consequence more of a country gentleman of high standing. There have been squeamish people who could not easily forgive Scott for his innocent deceptions and his failure to come out into the open as a proud representative of his art; but it is not difficult to understand him and it seems idle to be irritated with him. After all, he did not succeed thoroughly in his attempt to remain anonymous, for competent critics like John Wilson (q.v.) saw in the author of the novels the man who had written the poems and edited the ballads. The matter was enough discussed, however, to lead to the writing of J. L. Adolphus's "Letters" to Heber on the Waverley Novels and the question of their authorship (1821), but even after this unmasking Scott continued to wear his tenuous disguise for about six years.

'Waverley' was followed shortly by 'Guy Mannering,' which illustrated his genius as a painter of Scotch life and a revealer of Scotch character — especially in the lower ranks of life. Like its predecessor it was dashed off, but was none the less immensely successful. Scott was delighted, particularly as money began to flow in and he was thus enabled to pay obligations and buy more land. He visited London and was over-enchanted at the flattering reception given him by the Prince Regent; but then Scott was a born Tory and consequently not likely to see the spots in a royal sun. His cordial relations with Byron were much more to his credit, especially as he championed that unfortunate poet when all England was crying out upon him. Later he visited Waterloo and met Wellington, who greatly impressed him. The literary results of this tour, 'Paul's Letters to His Kinsfolk' and 'The Field of Waterloo,' a poem, were failures; yet Scott was a great martial poet, would probably have been a soldier if he had not been lame and could scarcely have had a more congenial subject. Fortunately no decline was visible in 'The Antiquary'; and in 'Old Mortality,' which came later in 1816, forming with 'The Black Dwarf' the first series of 'Tales of My Landlord,' Scott produced a story which in construction, characterization, historical imagination and sympathy, power of description and broad human interest, ranks deservedly, not only very high in the list of his own creations, but as one of the masterpieces of English fiction. The style is not flawless, the psychology is not penetrating, the art in general is less subtle and refined than that to which the novelists who have followed in Scott's wake have accustomed us; but in the essential points of wholesomeness and truth to nature and of large, copious, equable creative powers, Scott, as his influence upon other lands and generations plainly shows, has little reason to fear comparison with any of his successors.

At the close of 1817 'Rob Roy' followed and six months later came 'The Heart of Midlothian,' which to many readers marks the culmination of Scott's genius as a novelist. The public responded heartily to every fresh appeal, but, unfortunately, Scott's popularity was used as a club to force publishers to take over the worthless stock of his publishing firm, and Scott and the Ballantynes were inextricably involved with Constable, who finally became Scott's sole publisher and dragged him down in his own failure. Meanwhile, the tragic 'Bride of Lammermoor,' which appealed so deeply to the sombre genius of Poe, and 'The Legend of Montrose' appeared in 1819, despite the fact that Scott had suffered tortures from a stomachic trouble. The heroic way in which he dictated the 'Bride' to Laidlaw and John

Ballantyne is well known, as is also the fact that, when he got up from an illness which it was feared would prove fatal, he could not recall «a single incident, character or conversation» in the story. Yet such was his pluck that he not only began a new book, but actually branched out into a new type of novel by crossing the border and throwing his scene back into a remote past. 'Ivanhoe,' for so this important venture was named, appeared at the close of 1819 and may be regarded, not as the best, but as the most popular of all Scott's works and as the one which made him a favorite and a great influence throughout Europe. The brilliance of its descriptions and the thrilling interest of its plot continue to atone for the carelessness of its construction and the untrustworthiness of its representation of the epoch in which its scene is laid.

Scott was now at the height of his literary and his social renown. In 1820 he accepted a baronetcy from George IV — he had previously declined the laureateship — and published 'The Monastery' and 'The Abbot.' The next year came the popular 'Kenilworth' and 'The Pirate,' followed in 1822 by 'The Fortunes of Nigel,' and in 1823 by 'Peveril of the Peak.' A stroke that seemed apoplectic did not affect the power of that masterly portrayal of the age of Louis XI, 'Quentin Durward' (1823), but 'Saint Ronan's Well,' a novel of contemporary manners, has never been popular, a fate shared by 'Redgauntlet' (1824) and by the first of 'The Tales of the Crusaders' (1825) — 'The Betrothed.' The companion of the last named, 'The Talisman,' revealed, however, the old Scott; but despite the merits of this and of 'Ivanhoe' and 'Kenilworth' and the greatness of 'Quentin Durward,' the novels of this second period do not deserve to rank with those of the first. The stories of his period of financial ruin, 'Woodstock' (1826), 'The Fair Maid of Perth' (1828), 'Anne of Geierstein' (1829), were the work of a still vigorous and an even more heroic man; those of his complete physical breakdown, 'Count Robert of Paris' and 'Castle Dangerous' (1831), call for no criticism.

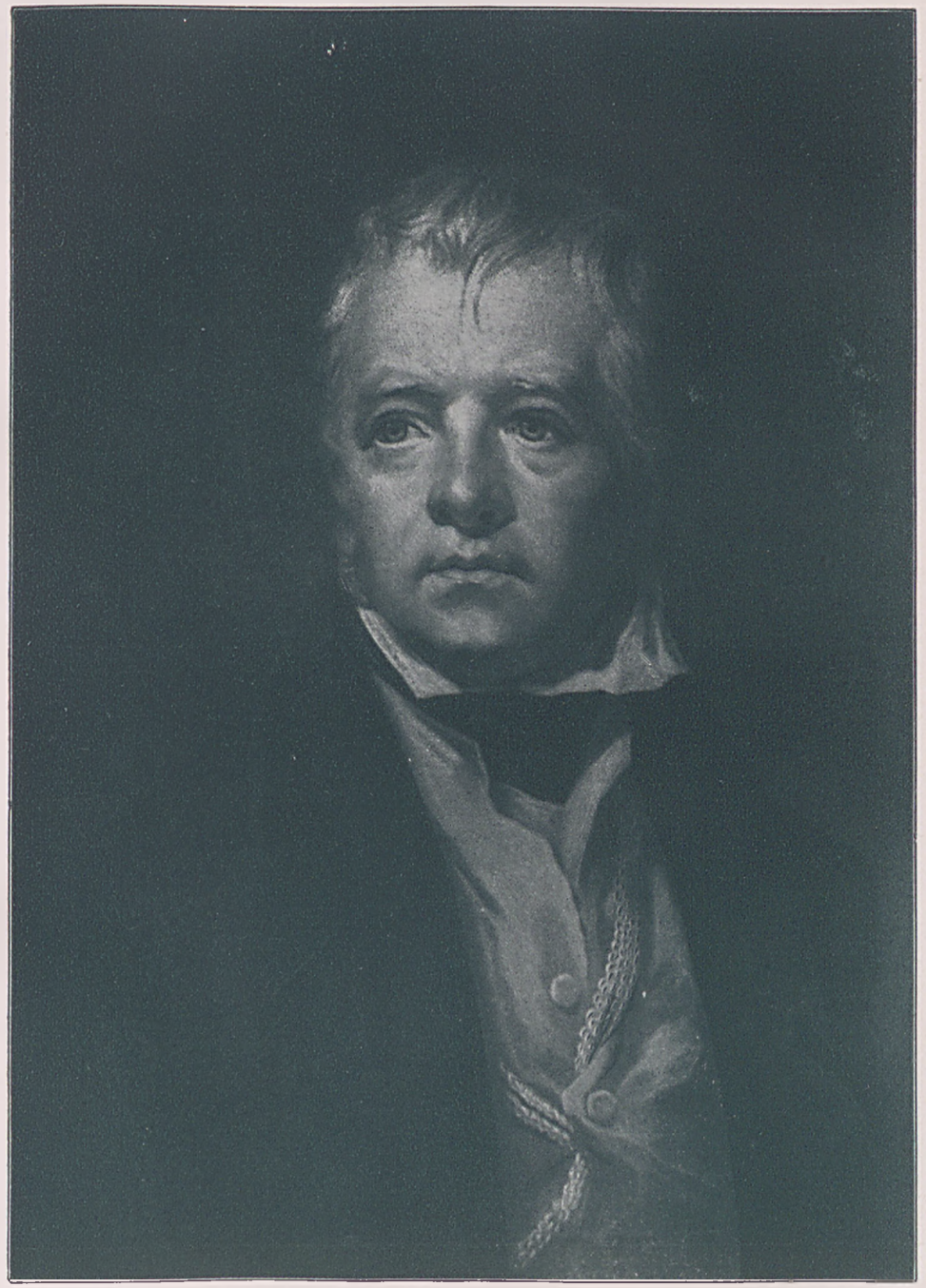
Meanwhile, the crash had come. Scott, confident in his powers, had not narrowly scrutinized his relations with the Ballantynes and Constable and, in his mania for lands and buildings and lavish hospitality, he had raised money on Constable's notes given for novels yet unwritten. A general period of depression came on and Constable failed in January 1826, bringing down with him the firm of James Ballantyne and Company, of which Scott was a partner. The result was that as Ballantyne was practically without resources, Scott felt bound in honor to pay off alone a debt of nearly £120,000. How he set to work on 'Woodstock,' how he refused all offers of help, how he made in two years, especially through his 'Life of Napoleon Buonaparte' (1827), the enormous sum of £40,000, how he bore the loss of his wife (1826) and his own infirmities, how he turned his pen to every possible task of profit — 'Tales of a Grandfather' (1829) combined pleasure with profit,— how he wrote admirable prefaces for a new edition of his novels — all this is familiar to the reader of Lockhart.

Early in 1830 he had a paralytic stroke and after that his efforts to save Abbotsford, where his creditors let him continue to reside, as the seat of the family he had so longed to establish, became truly pathetic. In April 1831 he had a still more serious stroke and a little later he suffered perhaps even more acutely from the rude treatment he received from the mob at Jedburgh, where he had gone to protest against the proposed reform of Parliament. A born conservative and ever a true child of the past, it was time for him to say good-bye to a world that was entering upon a series of rapid and far-reaching changes. After his last novel had been published, it seemed that he ought to try a milder climate in order to prolong his life. The government offered him the use of a frigate; and, after a notable parting with Wordsworth, he set out for Plymouth to take it. He visited Malta, Naples and Rome, then the Tyrol and the Rhine region. At Nimeguen, on 9 June 1832, he was severely stricken and was shortly after brought home to Abbotsford, where, on the afternoon of 21 Sept. 1832, he died, surrounded by his children.

He had been what, in his last words, he told Lockhart to be — a good man. His foibles and faults — we cannot lay the whole blame for his misfortunes on the Ballantynes and Constable — when they were not those of his class and his age, were such as detracted little from the greatness of his character, and much the same thing may be said of his defects as a writer. There have been few nobler spirits in the world's history; nor is it clear that since Milton's day a more illustrious or, take him all in all, a greater writer has been born within the lands that use the English tongue. Abbotsford yields only to Stratford as a literary shrine, but it is an ironical comment on Scott's labors to aggrandize his family that no direct male heir should welcome pilgrims to it. See GUY MANNERING; HEART OF MIDLOTHIAN: IVANHOE; KENILWORTH; LADY OF THE LAKE; MARMION; OLD MORTALITY; QUENTIN DURWARD; ROB ROY; also SCOTT, LOCKHART'S LIFE OF.

Bibliography.— The standard editions of Scott's poems and novels are those in 11 and 48 volumes with his prefaces (1829–33). The miscellaneous works fill 28 volumes in the edition of 1834–36. Of the numerous later editions mention may be made of the «Cambridge Edition» of the poems edited by H. E. Scudder (1 vol.) and of the «Border Edition» of the novels (48 vols., 1892–94) with excellent introductions, by Andrew Lang. The chief authority for Scott's life is his son-in-law, J. G. Lockhart's (q.v.) admirable biography (7 vols., 1837, but best read in the Cambridge Edition, Boston, 1902). There are short lives by R. H. Hutton ('English Men of Letters'), C. D. Yonge ('Great Writers'— with a bibliography), W. H. Hudson (1901), Lang, 'Literary Lives' (1906), Saintsbury ('Famous Scots,' 1897), Norgate, G. Le G., 'Life of Sir Walter Scott' (London 1906), and others. Attention should also be given to Scott's last 'Journals' (1890) and his 'Familiar Letters' (1894) edited by David Douglas. For criticism consult Lang's biography and introductions; F. T. Palgrave's introduction to the «Globe» edition of the poems; Leslie Stephen, 'Studies of a Biographer' (Vol. II, 1898) and 'Hours in a Library' (Vol. I); Ruskin, 'Fors Clavigera' and the histories of English literature.

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SIR WALTER SCOTT



SCOTT, Walter, Canadian statesman: b. London, Ontario, 27 Oct. 1867. He was educated in the public schools, and early settled in the North West Territory, where he engaged in printing and journalism. He owned and edited various newspapers in 1892–1906, and in 1900 was elected to the Canadian House of Commons. He was instrumental in creating the provinces of Saskatchewan and Alberta in 1905, became the leader of the Liberal party in Saskatchewan and served as its first Prime Minister in 1905–17. He was also Minister of Public Works in 1905–12, and later was president of the council and Minister of Education.

SCOTT, William Amasa, American political economist: b. Clarkson, Monroe County, N. Y., 17 April 1862. He was graduated from the University of Rochester in 1886, was professor of history and political science in the University of South Dakota, 1887–90 instructor and graduate student at Johns Hopkins University, 1890–92, receiving the degree of Ph.D. from that institution in June of the latter year; assistant professor of political economy in the University of Wisconsin, 1892–93; associate professor there 1892–97 and professor 1897–1900. Since the date last named he has been director of the school of commerce and professor of political economy in that institution. In 1911 he received the honorary degree of LL.D., from the University of Rochester. He has published 'Repudiation of State Debts' (1893); 'Money and Banking' (1903; 5th ed., revised and enlarged, 1916); 'Money' (1914); 'Banking' (1914); chapter on 'The Austrian School and Recent Developments' in Ingram's 'History of Political Economy' (new and enlarged edition, 1915); Introduction to 'Recent Literature on Interest' (1884–99) by Eugen von Böhm-Bawerk, translated from the German by him in co-operation with S. Feilbogen; several articles and monographs on economic and educational topics in encyclopedias and periodicals.

SCOTT, William Bell, Scottish poet and painter, brother of David Scott (q.v.): b. Edinburgh, 12 Sept. 1811; d. Perthshire, 22 Nov. 1890. He received his first education in art from his father, who was an engraver, and in 1834 began to write poetry for the current magazines. His first picture of note, 'The Old English Ballad Singer,' was exhibited in 1838. From this time forward his reputation as a painter was established. He is best remembered, however, as a poet. While for many years he was an exhibitor in the Royal Academy, his greatest activity was along literary lines. His most noted poetical works are 'The Year of the World' (1846); 'Poems by a Painter' (1854) and 'Ballads,' etc. (1875). His other writings include 'Lectures on Art' (1861); 'Albert Dürer: His Life and Works' (1869); 'The Little Masters' (1879); 'Life and Works of David Scott.'

SCOTT, William Berryman, American geologist, brother of Gen. H. L. Scott (q.v.): b. Cincinnati, Ohio, 12 Feb. 1858. He was graduated at Princeton University in 1877, and took his Ph.D. at Heidelberg in 1880. He was associated with the Princeton faculty from 1883 and from 1884 was professor of geology and palæontology there. He conducted the Princeton expeditions in Patagonia and was joint editor of the reports of the expeditions (8 vols.). He has written numerous monographs on geology and palæontology and is author of 'Introduction to Geology' (1897; 2d ed., 1907); 'History of Land Mammels of the Western Hemisphere' (1913); 'The Theory of Evolution' (1917).

SCOTT, Winfield, American soldier: b. near Petersburg, Dinwiddie County, Va., 13 June 1786; d. West Point, N. Y., 29 May 1866. After study at William and Mary College in 1805, he read law at Petersburg, and having obtained his license, rode the circuit and was retained in several causes. In 1808 he obtained a captain's commission in the United States army, and in 1809 embarked with his company from Norfolk to New Orleans. On 18 June 1812 war was declared by Congress against Great Britain (see WAR of 1812). On 6 July following Scott was commissioned the lieutenant-colonel of the Second Artillery. He at once was ordered to mobilize his regiment at Philadelphia and soon after, at his request, to proceed to the Canadian frontier. He arrived at the headquarters of Brig.-Gen. Alexander Smyth 4 October. The affair at Queenstown took place on 13 October. Scott did not take part in the successful attack on the heights, but commanded the American forces in the ensuing battle, and after brisk fighting was obliged to surrender to much superior numbers. He was soon after exchanged, in March 1813, was appointed adjutant-general with rank of colonel, and at about the same time was promoted colonel of his regiment. With the regiment he joined General Dearborn on the Niagara frontier, became Dearborn's chief of staff, led the successful attack on Fort George 27 May, commanded the rear guard in the retreat from Stony Creek to Fort George and co-operated with the naval forces in the descent on Burlington Heights and York. Promoted 9 March 1814 to be brigadier-general, he established a camp of instruction at Buffalo. Scott's brigade and Ripley's crossed the Niagara 3 July 1814; Fort Erie was invested and captured; and on the 4th Scott moved toward Chippewa. On 5 July occurred the battle of Chippewa (q.v.). Scott greatly distinguished himself, and General Brown, commanding, declared that to Scott more than any other the American victory was due. The battle of Lundy's Lane (q.v.) followed on the 25th, where Scott again displayed great ability. These battles, both won chiefly by Scott, fully established American military prestige. For his services, Scott received a gold medal from Congress, and was made brevet major-general (from 25 July). He declined to act as Secretary of War, and was in Europe in 1815–16. In 1826 he was made president of a board of army and militia officers convened at Washington for the consideration of various military questions, and in 1829 was assigned to the command of the Department of the East. In July 1832 he was ordered to Illinois to take command of the forces in the Black Hawk War (see BLACK HAWK), and left Buffalo for Chicago with 1,000 troops. He was not in the active campaign, but co-operated with Governor Reynolds of Illinois in concluding treaties with the Sacs, Foxes, Winnebagoes, Sioux and Menominees. At the time of the nullification troubles he was sent to South Carolina (1831–32), where he was successful

in averting civil war. He prosecuted the Seminole and Creek campaigns in Florida (1836), and superintended the removal of the Cherokees from Georgia to their reservation west of the Mississippi. On 25 June 1841 he became major-general and general-in-chief of the army. In 1839 at the Whig Convention at Harrisburg, Pa., Scott was presented as a candidate for the Presidency, though he urged Clay as first, Harrison as second, choice and the 62 votes cast for him went ultimately to Harrison. He was ordered on 23 Nov. 1846 to Mexico to take charge of the forces there. He assembled his troops at Lobos Island, moved transports in February, landed at Vera Cruz 9 March and effected its surrender 29 March. From this time he proceeded on the uniformly victorious campaign which practically closed the war by his entry into the City of Mexico on 14 September. (For complete account see MEXICAN WAR and articles on various battles). At the close of the war Scott relinquished the command to Gen. W. O. Butler, and returned to the United States, where he received a gold medal from Congress, and was a candidate in 1848 in the Whig Convention which nominated Taylor for the Presidency. In 1852 he was defeated by Franklin Pierce, and in 1855 made brevet lieutenant-general. In 1859, when the American and British governments were adjusting the northwestern boundary question, he was sent to Puget Sound to adjust the difficulties caused by the precipitate occupation of San Juan Island. At the outbreak of the Civil War, he took command at Washington 12 Dec. 1860, provided for the safety of the national capital, and the organization of the army, but resigned the command to McClellan 1 Nov. 1861. Scott was a strict disciplinarian and this, with his formality, led to his army nickname of "Old Fuss and Feathers." As to his skill as a military leader there can be no question. He gained notable distinction in two wars. Webster, in a Senate speech (20 Feb. 1848), called the Mexican War "the most brilliant campaign on recent military record," and Grant writes of the faultless strategy at Churubusco. His political defeats in no way detracted from his reputation. He published 'General Regulations for the Army' (1825) and 'Infantry Tactics' (1835). Consult biographies by Mansfield (1846); Headley (1852); Victor (1861) and Wright (1894); Scott's 'Memoirs' (1864); Townsend, 'Anecdotes of the Civil War' (1884); Wilcox, 'History of the Mexican War' (1892) and Barnes, J., 'Giant of Three Wars' (New York 1903).

SCOTT: Lockhart's Life of. The 'Life of Scott' by John Gibson Lockhart is the biography usually mentioned as a serious rival of Boswell's 'Life of Johnson.' The works have many points in common. Each has for subject one of the greatest men in English literature; each was written by a man intimately acquainted and thoroughly in sympathy with the subject; each is constructed upon a large plan, with canvas filled even to the smallest details. Furthermore, Lockhart followed the autobiographical plan of Boswell. Beyond these resemblances, however, there are striking dissimilarities. So far as command over language is concerned, Lockhart was probably superior to Boswell; but as a biographical artist he was clearly inferior. He did not possess Boswell's dramatic skill, nor his ability to report a conversation, nor his discrimination in selecting the most important material.

The 'Life of Scott' is probably the longest biography of established rank in the English language. Carlyle, who reviewed it before the publication of the seventh and last volume, deplored what seemed to him the excessive length of the narrative. "Study to think it nothing miraculous," he wrote, "that seven biographical volumes are given where one had been better . . . Scott's biography, if uncomposed, lies printed and indestructible here, in the elementary state and can at any time be composed, if necessary, by whosoever has a call to that." Carlyle's opinion has in the main been justified. In 1911 Sir Sidney Lee expressed his conviction that "Lockhart's merit is mainly due to the excellence and the abundance of the raw material provided for him in Scott's ample journals and correspondence." In short, the 'Life of Scott' is a Gothic cathedral, overawing us by its size and magnificence, rather than a Greek temple, gaining our admiration by its artistry and simplicity.

With all of its limitations, however, the biography is great. The combination of subject and biographer is sufficient to guarantee its greatness, and, to a certain extent, its finality. Lockhart, personally acquainted with Scott since May 1818, became his son-in-law on 29 April 1820, when he married Sophia Scott. The biography was completed in 1838, six years after Scott's death. Lockhart had access to all documents; his work, therefore, together with the journals of Scott later published in full, must always remain the great mine of information from which later biographers must dig. In writing the life of his father-in-law Lockhart had set "the truth and the fear of God" before his eyes; his work, consequently, is not a panegyric; but, like Boswell's 'Life of Johnson,' a straightforward account of faults as well as of virtues. Professor Hugh Walker, in 'The Literature of the Victorian Era' (pp. 920–923), highly commends Lockhart upon the skill and insight with which he interprets certain manifestations of Scott's character, particularly his love of display and his consequent lavish expenditure. The style of the biography is admirable; several passages, notably the description of Scott's death, are among the best in English literature. All in all, the work, by its very length and exhaustiveness, forms a noble monument to the memory of a man who did all things on a large and magnificent scale.

WALDO H. DUNN.

SCOTTDALE, skŏt'dāl, Pa., borough in Westmoreland County, on the Baltimore and Ohio and the Pennsylvania railroads, about 30 miles in direct line southeast of Pittsburgh and 16 miles south of Greensburg, the county-seat. It is in an agricultural and coal mining region, and it has considerable manufacturing interests. The chief manufacturing establishments are large pipe-works, rolling mill, foundry, machine shops and steel works. The coal mines of the vicinity contribute to the prosperity of the borough. The two banks have a combined capital of $100,000. The principal buildings are the churches and schools. The educational institutions are a high school, public and parish elementary schools, a private school and a public library. Pop. 5,678.

SCOTTISH CHIEFS, The, a romance by Jane Porter, published in 1810. It was still popular, and historically correct in all important points. The narrative opens with the year 1296.

SCOTTISH CLANS, Order of (American), an organization with 4,000 members, having its headquarters in Boston, Mass. It is a fraternal and benevolent order, having in 1903 a total income of $85,214. In the same year it paid out claims to the amount of $67,000.

SCOTTISH GAELIC LITERATURE. The Gaelic spoken in the Highlands and islands of Scotland forms one of the subdivisions of the Gaelic language, the other two being Irish and Manx. (See CELTIC LANGUAGES; GAELIC LITERATURE). It was introduced into the southern part of Argyll by the Dalriads, who emigrated from Ireland in the 6th century, and there established the subkingdom of Dalriada. The language spread until it became paramount, and it was used at court as late as the reign of Malcolm Canmore. Gaelic, which was the language of the district of Buchan in Aberdeenshire, in the 12th century, and was spoken in Galloway in Queen Mary's reign, gradually retired north and west beyond the Highland line, until now its strongholds are Arran and the Hebrides, the counties of Argyll and Inverness, Ross and Sutherland, and parts of Perth and Caithness. A strong Gaelic-speaking colony was founded in Carolina in the 18th century. In 1772 the first Gaelic-speaking immigrants landed in Cape Breton Island, Nova Scotia, and in the first quarter of the 19th century some 25,000 landed in that part of Canada. Prince Edward Island, Glengarry in Ontario and other parts also received settlers who spoke the Gaelic tongue and have maintained it to the present time. One of the objects of Lord Selkirk in founding the Red River Settlement was the formation of a Gaelic-speaking colony, which, through difference in language, would be proof against any tendency to amalgamate with the Americans. Within the past half century there has been a marked revival of interest in the Gaelic literature of the Highlands, one of the proofs of which was the founding of a Gaelic chair in Edinburgh University in 1882.

For nearly 300 years Scotland and Ireland had a common literary tradition, and the tales of the great Irish legendary heroes were current in the Scottish Highlands. Adamnan's life of Saint Columba, written in the island of Iona before 713 A.D., is the first literary product of Gaelic Scotland that survives. The 'Book of Deer' is of the 9th century; the 'Book of the Dean of Lismore,' by Sir James MacGregor and his brother Duncan, is a manuscript collection of date 1512–26. John Knox's *Liturgy* was the first book to be printed in the Gaelic dialect (1567). Long after the invention of printing the output was small in this language; only some 20 books had been printed in Gaelic up to the time of the Rebellion of 1745. A valuable collection of manuscripts is deposited in the Advocates' Library, Edinburgh. The language has been peculiarly rich in poets, a succession of notable bards appearing for about 300 years. Among them may be cited Mary Macleod (b. 1659); John Macdonald, a member of the Keppoch family; Alexander Macdonald, an officer in Prince Charles's army; Robert Mackay (Rob Donn, 1714–78); Ban McIntyre (1724–1812); Ewen McLachlan of Aberdeen (1755–1822), and William Livingston of Islay (1808–70). Consult Stuart's edition of the 'Book of Deer' (1862); 'Book of Lismore' (edited by MacLauchlan, 1862, and by Cameron, 1892); Blackie, 'Language and Literature of the Scottish Highlands'; Henderson, 'Norse Influence on Celtic Scotland' (1910); Sinclair, 'Gaelic Bards from 1411 to 1517' (1890); Carmichael, 'Carmina Gadelica: Hymns and Incantations, with Illustrative Notes orally collected in the Highlands and Islands of Scotland, and translated into English' (2 vols., 1900); McAlpine, 'Pronouncing Gaelic Dictionary, with a Grammar' (12th ed., 1903); McLeod, 'Dictionary of the Gaelic Language' (1909); Mac Bain, 'Etymological Dictionary of the Gaelic Language' (1911); Maclean, 'Typographia Scoto-Gadelica; or, Books printed in the Gaelic of Scotland from 1567–1914, with Bibliographical and Biographical Notes' (1915).

SCOTTISH PHILOSOPHY, School of, the school of philosophy founded by Thomas Reid, whose aim was to disprove the skeptical conclusions of Hume, which had obtained a wide vogue in Great Britain and on the Continent. Reid, who was born in Kincardineshire, Scotland, 26 April 1710, and died in 1796, insisted upon certain principles as everywhere present in experience, and he appealed to human consciousness and intelligence against what he called "the ideal theory." The resemblance of Reid's philosophy to Kant's vindication of the categories as elements necessary to the constitution of the simplest experience is obvious. Reid and his successors cannot be said to have produced a system, but they started many others in a train of thought that led to valuable philosophical observations, and the Scottish School of Philosophy proved no insignificant breakwater to the tide of skepticism which rose so high in the 18th century. Besides Reid, the most noted representatives of the Scottish philosophy were Dugald Stewart (1753–1828); Sir William Hamilton (1788–1856); W. Whewell, master of Trinity College, Cambridge (1794–1866); Henry Calderwood (1830–97). James McCosh (president of Princeton University from 1868 to 1888) and Noah Porter (president of Yale University from 1871 to 1886) belonged to the same school, and as teachers of philosophy contributed largely to its influence in this country. Consult McCosh, 'The Scottish Philosophy.'

SCOTUS, skō'tŭs, John Duns, Franciscan friar, one of the great lights of the mediæval scholastic philosophy and theology. The years 1265 and 1275 are variously assigned for his birth; he died at Cologne, 8 Nov. 1308. His cognomen Scotus plainly betokens his Gaelic origin. The chief advocate on behalf of Ireland is Luke Wadding, who contends that Scotus cannot have been an Englishman, since his epitaph runs, "Scotia me genuit, Anglia suscepit"; not a Scotchman, since Bonaventure, in a list of the Franciscan provinces, mentions that of "Scotia, or Ireland"; on behalf of North Britain, Thomas Dempster (1579–1625), "one of the most learned men whom Scotland has pro-

duced," wrote a quarto volume designed to prove Duns Scotus a Scotchman; and on behalf of England the celebrated antiquary John Leland (1506–52), adduced considerable proofs of Scotus' English origin. Duns Scotus entered the order of Franciscan friars early in life, studied at Merton College, Oxford, and became a Fellow of the same. He went to Paris in 1304, to Cologne in 1308, where he died suddenly the same year and was buried in the Franciscan Church. His works consist of commentaries on the logical works of Aristotle and the 'Isagoge' of Porphy, a commentary on Aristotle's 'De Anima,' two commentaries on Aristotle's 'Metaphysics,' besides a shorter work 'Conclusiones ex XII Libris Metaphys. Aristotelis'; 'Grammatica Speculativa'; 'Tractatus de Rerum Principio'; 'De Primo Principio'; 'Theoremata'; 'Quæstiones Miscellaneæ'; 'Quæstiones Quodlibetales,' and the unfinished 'Tractatus de Cognitione Dei.' All these except the 'Quodlibetica' were written at Oxford. There, too, he wrote his 'Opus Oxoniense,' which contains his whole philosophical and theological teaching in collected form. Soon after his death decrees were passed requiring the Scotist doctrine to be taught in all the Franciscan schools. His works were collected by the Irish Franciscan Wadding in 12 folio volumes (Lyons 1639). The doctrine and teaching of Scotus, one of the two great schools of scholastic philosophy and theology, found its home in the Franciscan order to which its founder had belonged, just as the Thomist school found its home among the Dominicans of which Thomas of Aquin, its founder, was a member. Scotus was an earnest and most ingenious champion of the doctrine of the Immaculate Conception against the opposite teaching of the rival order of Dominicans. His place as theologian and philosopher was and is of the highest. See SCHOLASTICISM.

SCOTUS ERIGENA, ĕ-rij'ĕ-na, **Johannes,** Christian philosopher of the Carlovingian period. Everything concerning the place or date of his birth is conjectural. It has been divined from his name that he was of Scottish race and Irish birthplace. He was probably born between 810 and 815. He is said by some apocryphal authorities to have traveled in Greece, Asia, Egypt, Italy and France. But his first actual appearance in history is in the court of Charles the Bald, who was himself devoted to letters. He was induced by this monarch to translate the treatise 'On the Heavenly Hierarchy,' the work of the pseudo-Dionysius, the Areopagite. The attention of Hincmar, archbishop of Rheims, was attracted by the fame of Erigena who wrote at that prelate's request his work on 'Predestination.' 'The Heavenly Hierarchy' was a work which had a great deal of influence in development of mysticism (q.v.) in France. Pope Nicholas I in 867 complained to Charles the Bald that such works as this version of the Neo-Platonist's work were of doubtful tendency; it is not known what reply he received, but after that date Erigena drops out of the light of history. Johannes Scotus Erigena translated all the works of the supposed Areopagite; he also composed a treatise on the Eucharist in which he denied the real presence. His philosophical views were set forth in his 'Divisions of Nature' which caused him to be charged with pantheism; and modern historians of philosophy have looked upon him as the precursor of Spinoza. It is certain that 400 years later (1225) Pope Honorius III, during the Albigensian crusades, condemned the book and ordered it to be burned publicly. Consult Hjört, 'Johann Scotus Erigena' (1823); Guizot, 'Histoire de la civilisation en France'; Milman, 'History of the Latin Church.'

SCOURGE OF GOD, The. See ATTILA.

SCOURING-RUSH. See DUTCH RUSH; RUSH.

SCOVEL, Sylvester, American journalist and engineer: b. Denny Station, Pa., 29 July 1869; d. Havana, Cuba, 11 Feb. 1905. He was educated at the University of Michigan, and in 1895 went to Cuba as war correspondent. He broke through the Spanish police and military lines 30 times, was twice captured, once making his escape, and on the second occasion, in 1897, was released at the request of the United States government. He was subsequently correspondent in the Turco-Greek War, in Spain, and in the Klondike, and returned to Havana just before the destruction of the *Maine* in 1898. He was with the army and navy until the surrender of Santiago, and after that was engaged in the promotion of various Cuban enterprises. In 1899–1902 he was consulting engineer for the United States military government Cuban customs service.

SCRANTON, George Whitefield, American manufacturer: b. Madison, Conn., 11 May 1811; d. Scranton, Pa., 24 March 1861. With his brother, Joseph H. Scranton, he engaged in the manufacture of iron at Oxford, N. J., in 1839, and in 1840 they established smelters at Slocum, now named in their honor, Scranton, Pa., using anthracite coal in their furnaces. Later Scranton became interested in railroad transportation, and he was president of the Lackawanna and Western and of the Cayuga and Susquehanna railroads. He served in Congress in 1859–61.

SCRANTON, Miss., town and county-seat of Jackson County, on the Pascagoula River, near the Gulf of Mexico, and on the Louisville and Nashville Railroad, about 48 miles southwest of Mobile, Ala. It is in a lumbering region, and the town is known also for its extensive fisheries, especially the oyster industry. The chief industries are connected with the manufacturing and shipping of pine lumber, and, in the season with the canning and shipping of oysters. Pop. about 2,500.

SCRANTON, Pa., city and county-seat of Lackawanna County, is the third in population in the State. It is 167 miles from Philadelphia, northerly, and 134 from New York, westerly; and a central point on the Delaware, Lackawanna and Western Railroad. It is also entered by the Central Railroad of New Jersey, branches of the Delaware and Hudson, the Erie and the New York, Ontario and Western railroads. The Lackawanna and Wyoming Valley Railroad (Laurel Line), of new and costly construction and operated by electricity, is another connecting link south and eastward. Built on both sides of the Lackawanna River, which merges into the Susquehanna River some eight miles to the southward, the city is pleasantly

SCRANTON, PA.



1 Lackawanna County Court House, showing Scranton Board of Trade Building
2 Skyline of Scranton's business section

SCRANTON, PA.



1 Nay Aug Falls in the heart of Scranton
2 Delaware, Lackawanna and Western Railroad Viaduct, Nicholson, near Scranton, Largest concrete bridge in the world

situated on an undulating plateau in the Lackawanna Valley, at a mean altitude of between 700 and 800 feet above sea-level. Mountain ranges on either side attain an elevation of from 1,000 to 1,200 feet more. Laid out with wide streets and avenues, it has also many driveways, a courthouse square and three parks. Among the prominent public buildings in Scranton are the post office, courthouse, municipal building, public library (Albright Memorial), 13th Regiment Armory and the Moses Taylor Hospital. There are three other general and two private hospitals, a Y. M. C. A. building, the buildings of the International Correspondence School, theatres, numerous public and private schools and churches of all denominations, many of the church and school buildings being large and costly.

Industries.— Scranton is the centre of the chief anthracite coal district of the United States and has many large collieries within its limits. Prior to its development in coal mining, a blast furnace was first erected here in 1840 and was soon followed by a rolling and rail mills. Subsequently other important establishments working in iron, but less extensively, became well-known producers of mining machinery and other tools, and of steam boilers, locomotives, car wheels, wagon axles, stoves, grates, nuts and bolts, railway spikes and the like. For reasons of an economic nature the rolling and rail mills have in later years been taken elsewhere, but the other industries continue; and still more diversified ones have been introduced, manufacturing articles of various materials, including silk and silk goods, under and outer wear, buttons, lace curtains, pianos, pumps, iron founding, locomotive and stationary engine works, etc. Steam heating by the district plan is supplied on a large scale to the business and many residential sections by a private company. In addition to much Scranton capital invested in all parts of the country, other local interests are cared for by 20 banking institutions with a capital and surplus of $11,891,107, total deposits of $41,643,983, and annual clearings of about $175,000,000, and sundry building and loan associations. Local newspapers, daily and weekly, and numerous monthly and other publications are regularly issued. The International Correspondence Schools are located here. This is the largest educational establishment in the world. It gives employment to more than 4,200 people, and has enrolled 1,400,000 students, representing every nationality in the world.

History.— This locality was originally settled 1788–1800. Early in the century it was called Slocum Hollow, after the Slocum family, then prominent in its affairs. More active development took place after 1840, largely through the initiative of Col. George W. and Seldon T. Scranton, and associates. It was named in honor of the former and has since been known as Scranton. It was incorporated as a borough in 1854 and as a city in 1866.

Government and Social Life.— The city is governed by a mayor elected for four years, city controller and council of five members. The administrative departments are those of public safety, public works, city treasurer, city attorney, assessor, city clerk and the sinking fund commission. Social life of Scranton is evidenced in numerous associations, clubs and lodges of all kinds; while many and effective public and semi-public charities are also well supported by the citizens.

Statistics.— The municipal area is practically 20 square miles, divided into 24 wards. There are 185 miles of streets, avenues and courts, of which 68 miles are paved; and the sewer system measures 110 miles. Public lighting is by electricity; the police department costs annually not less than $120,000, and the fire department $125,000. The school enrolment exceeds 20,000 pupils, and annual expeditures for public education are more than $900,000. Assessed property valuation in 1918 was about $100,000,000. Average annual death rate is less than 16 per thousand, but only 13 for the year 1916. Scranton is one of the few large cities in the United States having an almost unlimited water supply, though not controlled by the city. The water is soft and pure, impounded from mountain streams and a large, well-protected watershed. It is delivered by gravity from several reservoirs and a large artificial lake. The daily water consumption is about 25,000,000 gallons, while an average of about 5,000,000,000 gallons is kept in store the major part of the year. Pop. (1920) 137,783.

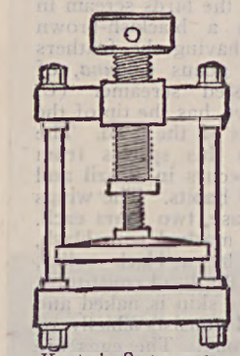
SCRATCHING. See BALLOT.

SCREAMERS, the name given to two or three genera of birds, forming the family *Palamedeidæ*. In the genus *Palamedea* the nostrils are oval, the head possesses a slender frontal horn more than three inches long; the wings each bear two sharp shoulder spines with bony cores, and the long toes are covered with square scales above. To this genus belongs the horned screamer (*P. cornuta*), of the Amazon Valley and Guiana, which inhabits hot morasses and swamps. This bird equals a turkey in size. The voice is shrill and loud and the birds scream in concert. The plumage is a blackish-brown above, the head and neck having the feathers marked with white. The genus *Chauna*, of which the chaja or crested screamer (*C. cristata*) is the representative, has the tip of the bill hooked. No horn exists on the head. The name "chaja" is given to this species from the sound of its cry. It occurs in Brazil and Paraguay. It is of solitary habits. The wings possess, as in the former case, two spurs each. The color is a bluish-gray marked with black, the neck being encircled by a black collar, while a tuft of feathers on the head constitutes a crest. Round the eyes the skin is naked and of a red color. The food consists chiefly of plants and the flight is strong. The eggs are two in number. A third form (*Ischyromis derbiana*), closely related to the last, inhabits Central America. A remarkable feature of all of these birds is the great development of subcutaneous air-sacs, like a thick layer of bubbles beneath the skin, which make a crackling sound when pressed. Although galline in appearance and general habits, these birds are more closely related to the ducks and geese. Consult Evans, A. H., 'Birds' (in 'Cambridge Natural History,' Vol. IX, New York 1900), and Sclater and Hudson, 'Argentine Ornithology' (London 1888).

SCREEN, in ecclesiastical architecture, a partition of stone, wood or metal to separate different parts of the building; as, the nave or an aisle from the choir, or a private chapel from

the transept. The term is also applied to a partition extending across the lower end of a mediæval hall, forming a lobby within the main entrance doors, and having often a gallery above; also to a decorated wall enclosing a courtyard in front of a building.

SCREW, a wooden or metal cylinder having a spiral ridge (the thread) winding round it in a uniform manner, so that the successive turns are all exactly the same distance from each other, and a corresponding spiral groove is produced; also a reversed mechanism, in which the interior of a cylinder in a cylindrical hole or nut is provided with a corresponding uniform spiraled groove or thread, into which a screw (as first defined) may fit. For differentiation the primary screw is termed a male screw, and the secondary form a female screw. The male and female screw in combination form one of the six mechanical powers, being simply a modification of the inclined plane. The energy is transmitted by means of a hollow cylinder (the female screw) of approximately equal diameter with the solid one (the male screw). Hence the one will work within the other, and by turning the convex cylinder, while the other remains fixed, the former will pass through the latter, and will advance every revolution through a space equal to the distance between two contiguous turns of the thread. As the screw is a modification of the inclined plane it is not difficult to estimate the mechanical advantage obtained by it. If we suppose the power to be applied to the circumference of the screw, and to act in a direction at right angles to the radius of the cylinder, and parallel to the base of the inclined plane by which the screw is supposed to be formed, then the power will be to the resistance as the distance between two contiguous threads to the circumference of the cylinder. But as in practice the screw is combined with the lever, and the power applied to the extremity of the lever, the law becomes: The power is to the resistance as the distance between two contiguous threads to the circumference described by the power. Hence the mechanical effect of the screw is increased by lessening the distance between the threads or making them finer, or by lengthening the lever to which the power is applied. The law, however, is greatly modified by the tremendous friction induced. The uses of the screw are various. It is an invaluable contrivance for fine adjustments such as are required in fine telescopes, microscopes, micrometers, etc. It is used for the application of great pressure as in the screw-jack and screw-press; as a borer in the gimlet; and in the ordinary screw-nail we have it employed for fastening separate pieces of material together. The *differential screw,* or *Hunter's screw,* is formed of two screws, a larger and a smaller, the former being screwed internally to allow the latter to screw into it; the pitch of the two screws differs slightly, and for each turn of the chief or larger screw the progress of the point of the compound screw is the difference of pitch. Great power is in this way attained without the weakness due to a screw with fine threads. Screws for working in wood are commonly tapered, coming to a point; while machine-screws for use in metal are cylindrical and commonly flat or dull-pointed on the forward end. Exceptions are the set-screw, which has a sharp circular ridge on the forward end, to give it a bite or set when screwed down hard; and screws that are pointed or squared for some special purpose. Machine-screws were originally made by hand, a blank being forged on the anvil, and the thread being cut on a lathe or even with a file. Under this primitive system no two screws were alike, and when a screw had to be replaced it was difficult to make another that would fit. Henry Maudsley, of England, about the opening of the 19th century, gave great study to the production of uniform and accurate screws, laying the foundation for modern interchangeable machine-screws. He was followed by Sir Joseph Whitworth, who established the primary system of uniform threads subsequently accepted by leading machine-builders all over the world. Later, the Sellers standard was adopted in America and largely followed. The chief difficulty was the attaining of accurate and uniform pitch or spacing of the screw-threads, because any error was multiplied. For instance, an error of one ten-thousandth of an inch in a space between screw-threads, which would ordinarily pass unnoticed if there were only half a dozen turns, would increase with the length of the screw and number of threads, so that with 24 threads to the inch, a screw a foot long would multiply that error by 288, so that the screw would bind and jam before it would go far into its counterpart. It was found, in cutting a thread, that the very heating of the bar of metal and of the cutting tools, by their own friction, caused a variation in the threads, because of the expansion of metal under heat. But by ingenious means such errors have been compensated, and screws are now turned out very cheaply with great accuracy.


Hunter's Screw-press.

To cut a screw-thread by hand, the blank or bit of stamped metal, or a metal rod of the desired diameter, is mounted between the centres of a lathe, while a cutting tool is fixed on the slide-rest, and forced against the rotating blank, the slide-rest having a positive lateral rate of movement, so that a spiral is cut in the blank, the form of such spiral being determined by the ratio of the speed of rotation of the blank to the lateral movement of the cutting tool. This process is repeated until the thread is sufficiently deep, and it matches a master screw, which is placed beside it to test its accuracy. Another method is to use a screw-die and die-stock, which carries a pair of hardened steel cutting dies of the desired standard. These dies are placed straddle of the rod or blank, and being fixed in the die-stock, either the work or the stock is rotated until the thread is cut, the dies being pressed together gradually by a screw in the stock. Similarly a female thread may be formed with a screw-tap worked into a hole with a wrench. But in modern screw-making only the above principles are followed, screws being made on lathes specially designed to work automatically and cut a large number of accurate screws at one operation. These machines are so thoroughly automatic, that an attendant can watch several of them, so that vast numbers of small screws can be turned out at surprisingly small cost, when their almost perfect accuracy is considered. By employing what are termed "change-wheels" on the heads of the lathes, the number of screw-threads may be altered from one standard size to another. A common principle used in screw-cutting is to employ a master-screw, or hardened screw known to be of accurate standard, as a guide for the cutting of duplicates. This master-screw carries a nut, which travels and directs the movement of the blank or bar that is being threaded. The heads of screws may be formed — (a) by upsetting or thickening the blank before cutting; or (b) by using a bar of the diameter of the head, and milling away the superfluous metal. In modern practice a milling cutter is often employed in making screws on a special machine which is half lathe and half miller. The milling cutter is mounted on a swiveling device for forming various angles in the thread. This method is well suited to forming screws that are of alloyed metal, where the cutting speed must be made suitable to the alloy. It is not adapted to very small screws, but is admirable for cutting worms or other very broad threads.

The familiar types of screw are named from the thing to which they are attached, as bench-screw, a coarse screw on a carpenter's bench for clamping the work; from the form or shape of the head, as square, hexagonal, round, conical, countersunk screw, etc.; from the character of the thread, as standard V, double (having two parallel threads running together), triple, etc. A winged or thumbscrew has a flat head that may be turned with the thumb and fingers; the Archimedian screw is a spiraled trough or tube which when laid at an angle of about 35 degrees, with the lower end in water, can be made to raise the water by turning; the differential screw has two different threads on one solid body, so that its ultimate motion is the difference between the pitch of the two threads; flat-screw, a spiral on the face of a disc, as a Victor record; interrupted screw, one having grooves cut longitudinally with threads like a tap; screw-coupling, a pipe coupling or metal collar with interior or female threads for joining pipes or round rods; screw-dog, a lathe-dog having a screw for gripping the work; screw-eye, a screw having a loop or eye for a head — when made with a hook it is a screw-hook; screw-plate, the holder of a die-stock; screw-press, a press in which the power is applied by a screw, as the primitive form of printing press; screw-rod, a rod having a screw-thread cut on one or both ends; screw-wrench, any wrench whose jaw is moved by a screw; tractor-screw, the screw-propellor of an aeroplane when placed in front as a tractor.

In 1914 there were 66 establishments in the United States devoted to manufacturing machine-screws and 12 to wood-screws. The number of employees was larger with the wood-screw makers, being 4,464 and 3,643, respectively; but the gross money value was $7,248,000 for the machine-screws and $6,217,000 for the wood-screws. Probably this is less than half the production of the entire country, as very many machine manufacturers make their own screws.

CHARLES H. COCHRANE,
Author of 'Modern Industrial Progress.'

SCREW-PINE, a popular name for species of *Pandanus,* order *Pandanaceæ.* The species, of which more than 50 have been described, are natives of the tropics, and are especially numerous in the Australasian Archipelago. They are mostly trees or shrubs with slender or stout trunks, frequently with acrial roots. Each naked branch is terminated by a tuft of long sword-shaped spiny-edged leaves. In tropical countries *P. utilis* is highly valued for its edible fruits, and the fibres of its roots and leaves. The leaves of *P. odoratissimus* also yield a valuable fibre (q.v.). The former species, which has green leaves, and *P. veitchii,* which has variegated foliage, are widely popular in greenhouses, being easy to rear, fairly rapid in growth, and striking in appearance. The name screw-pine is suggested by the perfect spiral arrangement of the leaves easily observed in mature specimens, and also from their resemblance to the pineapple.

SCREW PROPELLER, a mechanical device embodying the principle of the screw, employed in the propulsion of various kinds of marine craft — ocean steamships, warships, tug-boats, yachts, motor-boats, etc.— and all forms of aircraft. Only the marine form will be treated here: for the air propeller see AEROPLANE — CONSTRUCTIONAL FEATURES.

The marine propeller consists of a cylindrical or spherical hub or boss to which two or more blades are attached with bolts, and forms the screw which acts in the water somewhat like a screw bolt in a nut and the rapid rotation of which around its axis pushes the vessel forward.

It is the accepted modern method of ship propulsion and although known to waste at least 40 per cent of the power delivered to it by the driving engines, it has almost completely superseded the paddlewheel and confined the application of the latter to river steamers and other light draft craft.

Although known in principle to the ancients, and suggested in France by Bernouille in 1752, by Edward Shorter in 1800, and by Dallery in 1803, the credit for its modern reinvention and practical application appears to belong to Ressel, the Austrian inventor, who took out a patent for it in 1812 and used it practically on the steamer *Civetta,* in 1829. The idea was further developed by Sauvage in 1832, and a few years later, in England, by Smith and Ericsson. Smith's modification — the reduction in the number of blades, was suggested by an accident which broke off one of the six blades in his propeller, resulting in a decidely accelerated motion of the vessel.

In America, Evans and Fitch experimented with screw propellers in 1780 and 1790, and Stevens successfully operated a steamboat equipped with a screw propeller, in 1802, but it was most practically developed and applied by Ericsson in 1839, in connection with the United States steamer *Princeton* which was the first screw-propelled war vessel ever built in any country. She was built through the recommendation of Commodore Stockton, under

Ericsson's personal superintendence. She had a tonnage of about a thousand tons, and was the first war vessel in which the machinery was entirely below the water-line, and her unqualified success not only demonstrated the particular value of the screw for vessels of war, but quickly led to its general application to those of the merchant service as well, before the close of the year 1870.

Each blade of a screw propeller may be considered as the small portion of a complete screw-thread of great pitch, and considerable depth relative to the pitch. The pitch of a propeller is the distance through which a point on the tip of one of the blades would move — in one revolution, assuming the water in which it turns to be a solid medium. As the water is not solid, but gives way as soon as its low degree of inertia is overcome, the shape given to the blade is not that of the true helical screw, but is so modified as to give it the firmest possible grip on the yielding water. There are two general types — (1) those in which the blades are plain warped surfaces, and the pitch is constant at all points, that is, the generating line of every blade keeps the same angle with the boss, and (2) those in which the blades are curved and bent in various ways, and the pitch is variable at different parts of the blades. Many different screws of this type, with variable or increasing pitch, have been designed in the attempt to produce a form that would reduce to a minimum the loss of applied power due to the rotary motion of the screw which forces the water away radially and the loss due to the friction of the blades. In the earlier forms, in which the boss was of small diameter — about twice that of the shaft — the increasing angle of the blade surfaces, as they approached the axis, placed them at the boss in a position parallel to the keel, so that the central portion of the screw gave very little propulsive efficiency — a great deal of the power being used up merely in churning and agitating the water. Another cause that wasted a great deal of energy was the number and length of the blades, and their great width at the ends, all of which absorbed power by surface friction.

To obviate these faults, Griffiths substituted for the central portion a large spherical boss, one-third the diameter of the whole propeller, which revolved smoothly in the water. He also diminished the width of the blades, and attached them to the boss in such a manner that they could be turned upon their axes and thus given various inclinations according to the speed intended for the ship. In the latest types of propellers, the diameter of the boss varies from one-fifth to one-third of that of the whole screw; while the diameter of the whole screw depends upon the speed required, the character of the driving machinery, the form of the ship, and many other conditions for which only approximate rules can be given. It is interesting and valuable to note in this connection, that upon the basis of the data derived from the actual tests of a great variety of screw propellers it is safe to state that the exact effect due to the form of their blades has not as yet been definitely determined, and that the shape of the hull of the vessel is by far the chief controlling factor in determining the question of speed.

Another factor which adds greatly to the loss of applied power is the "slip" resulting from the working of the screw in a yielding or fluid medium and, therefore, requiring a greater number of revolutions to travel a given distance than would be required if it worked in a solid medium. Slip is a factor which adds greatly to the waste of applied power in all forms of propellers — sails, oars, paddlewheels, etc. In the case of the screw propeller, the difference between the distance traveled by the screw in a fluid, and the interval of its advance in a solid medium is known as the "apparent slip"; while the backward velocity given to the water immediately acted upon by the screw, is called the "real slip." Both of these results are consequences necessitated by the working of a screw in a fluid medium, and may under certain circumstances vary considerably from each other. "Negative slip" is a term used to denote the actual speed of a ship above its calculated speed, very often attained by a change of the size or form of the propellor. Real slip may be expressed by the formula $\frac{v+f-s}{v}$, in which (v) represents the speed of the screw, (s) the speed of the vessel, and (f) the velocity of the forward motion of the water following in the wake of the vessel. The factor (f), being due to the frictional resistance of the vessel, depends so much upon the shape of its hull, that it is not susceptible of accurate determination, so that in considering the loss of applied power in this connection, the result ordinarily referred to is the apparent slip.

The speed of propeller is expressed by multiplying the number of its revolutions per minute by its pitch. This expression gives the theoretical speed per minute. The slip being subtracted from this gives the actual or effective speed. If the vessel were moored to a dock while the screw was running, the entire speed would be nullified by the slip.

The efficiency of different forms of propellers differs but slightly so long as their pitch, and their blade areas are designed correctly to suit the conditions for which they are employed. In general three-bladed propellers are the most efficient and are freer from vibrations than the other forms. As previously stated, however, the most important element affecting the propulsive efficiency of a screw propeller is the form of the vessel. For low speeds, bluff bows and full sterns gives results equally as good as sharp bows and lean sterns with a long hollow run; while on the other hand the last-named qualifications give a form that allows the waves of replacement to flow in solidly to the propeller, and is the most appropriate for high speeds. In general it may be said that the problem of the most efficient propeller for any given ship depends upon the speed at which the ship is intended to be driven. This being decided, the hull must be modeled in such lines that the water pushed to either side by the passage of the vessel shall have ample time and room to come solidly together again before the propeller begins to work in it. Hence, the slower the speed the fuller the stern may be modeled; and the higher the speed, the finer the lines of the stern approaching the propeller. Upon the

modeling of the hull, therefore, depends the speed of the engines. If the propeller is turned too fast for the possible speed of the model through the water it will simply churn the water (in part) to foam, at a great loss of efficiency. So that the number of revolutions of the screw per minute is actually determined by the shape of the hull, and its consequent resistance to motion through water. A slow moving screw may have narrower and longer blades, thus reducing the friction of the blade surfaces on the water, and in this way making for efficiency of the power delivered by the engine. And a slow moving screw may also have a greater pitch than a fast running screw, and this also tends to increase efficiency. The most satisfactory slow propellers (those on merchant ships) have a pitch of 1.2 to 1.5 times the diameter of the screw. On the contrary, the fast screws on passenger ships and war vessels, particularly those run by turbine engines, have a pitch of less than their diameter, and broad squat blades. Broadening the tip of the propeller blade increases the thrust, but slows down its speed. Conversely, the slow engine admits of a propeller of larger diameter, and with wider tips; and the efficiency of engines is greater at moderate speeds. So that the problem of the propeller depends upon the skilful balancing of many requirements and each must be given its weight in the compromise to achieve the best possible result.

Figs. 1 to 8 show a few of the 150 forms of screw propellers, designed at different periods, and illustrate in a general way its development from the primitive form designed by Ressel in 1812. All of those used at the present time,

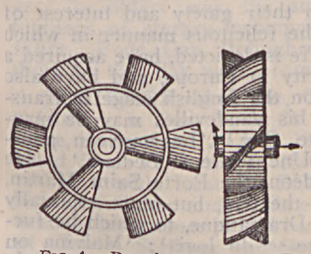


FIG. 1.—Ressel-1812.

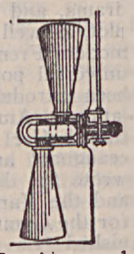


FIG. 2.—Ressel-improved.

however, are modifications of the Griffiths, Thornycroft, and Jarrow types. The Hirsch propeller has not come into general use for shipping, although in all trials it has shown an

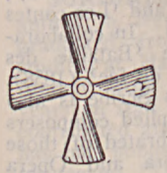


FIG. 3.
Ericsson — 1835.

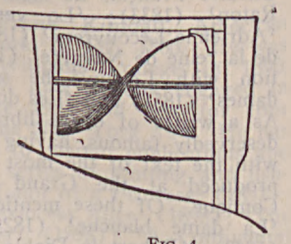


FIG. 4.
Maudslay — 1848.

efficiency from 3 to 8 per cent higher than the other types. It has, however, been largely adopted for motor-boats and small yachts and speed boats, and there are numerous modifications of it under various trade names. The so-called "weedless" propellers are on Hirsch lines.

Propellers are built of iron, steel or bronze. The last named is the preferred material and while there are as many formulas as there are



FIG. 5.
Hirsch — 1860.

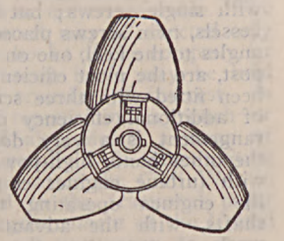


FIG. 6.
Griffiths — 1865.

manufacturers, they may be classified generally under four groups: (1) Admiralty bronze, with a composition of about 87 per cent copper; 8 per cent tin; 5 per cent zinc; and with a strength of 15 tons to the square inch; (2)

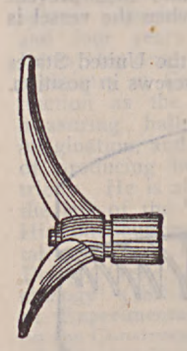


FIG. 7.
Jarrow — 1880.

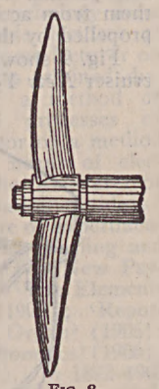


FIG. 8.
Thornycroft — 1885.

phosphor bronze, 82.2 per cent copper; 12.95 per cent tin; 4.28 per cent lead; 0.52 per cent phosphorus; and with a strength of 17 tons per square inch; (3) aluminum bronze, 95 per cent copper and 5 per cent aluminum; with a strength of 25 tons per square inch; and (4) manganese bronze, of secret composition, except that it contains both copper and zinc, and has a strength of 30 tons per square inch. The cast iron or cast steel propellers of the slow-going merchant ships have a strength of from 10 to 20 tons per square inch. This would not be safe for a fast running propeller. The blades are cast solid with the boss, or made separate and bolted or attached to it in various ways. For small boats a reversible propeller is made in such fashion that the pitch of the blades may be altered from right-hand to left-hand by moving a lever working through a hollow propeller shaft, thus reversing the direction of the thrust without reversing the engine. A screw propeller when in position is secured to the end of the shaft of bronze or steel called the propeller or tail shaft, which is connected to the line shafting attached to the crank shaft of the driving engine. The push

or thrust of the screw, which is equivalent to the resistance of the hull, and amounts to about 20,000 pounds per 1,000 horse power, is received on a thrust bearing provided with a series of collars and grooves which fit similar ones on the shaft. Small vessels, and those designed for slow speed, are usually equipped with single screws; but for large high speed vessels, twin screws placed horizontally at right angles to the keel, one on each side of the stern post, are the most efficient. Some vessels have been fitted with three screws, but the amount of additional efficiency derived from the arrangement is a very doubtful quantity. On the other hand, high-powered vessels equipped with turbine engines employ multiple screws, the engines operating two, three or more shafts, with the advantage of dividing the work of generating the enormous power required by large modern ships among several small engines instead of one large ponderous machine, thus reducing to a minimum the difficulties and dangers incident to breakdowns. Sailing vessels using steam only as an auxiliary power are equipped with "feathering" screws, the blades of which can be closed together in a line parallel with the keel, and thus prevent them from acting as a drag when the vessel is propelled by the sails alone.

Fig. 9 shows the stern of the United States cruiser *New York* with twin screws in position.

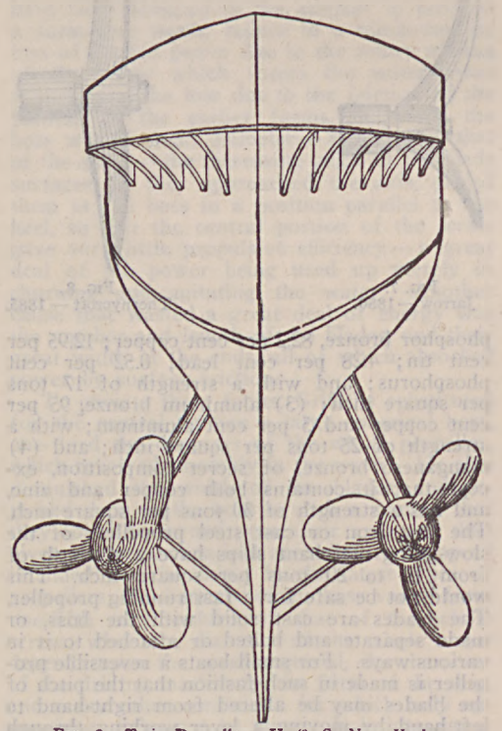


FIG. 9.—Twin Propellers, U. S. S. *New York*.

Bibliography.— Baker, G. S., 'Ship Form, Resistance and Screw Propulsion' (New York 1915); Dyson, C. W., 'Screw Propellers and Estimation of Power for Propulsion of Ships' (New York 1913); Peabody, C. H., 'Propellers' (New York 1912); Seaton, A. E., 'The Screw Propeller and Other Competing Instruments of Marine Propulsion' (London 1909).

SCREW-WORM FLY, one of the flesh-flies (q.v.) most troublesome to domestic animals in the southwestern United States. It lays its eggs in wounds, and the twisted larvæ feed and move in the flesh, making a bad sore.

SCRIABIN, skrī'ä-bēn, **Alexander,** Russian composer: b. Moscow, 10 Jan. 1872; d. there, 1915. In early life he was trained for a military career, but entered the Moscow Conservatory where he studied piano under Safonov and composition with Tanciev. In 1892 he won the gold medal for piano playing and during European tours achieved fame as a virtuoso. During 1898–1903 he was professor in the Moscow Conservatory, then resigned and devoted his energies to composition. Chopinesque yet original, his early piano pieces are marked by fervid spirituality, which led him after 1900 to formulate a synchronous theory of music, color and perfume which he sought to prove by means of his "color keyboard," and his symphonic work 'Prometheus or Poem of Fire.' His other works include a piano concerto and four symphonies.

SCRIBE, skrēb, **Augustin Eugène,** French dramatist: b. Paris, 24 Dec. 1791; d. there, 20 Feb. 1861. He was originally intended for the legal profession, but early abandoned it for the more congenial occupation of a writer for the stage, in which after a careful study of the public taste his success was very decided. His first piece was 'Les dervis,' written in conjunction with his friend Germain Delavigne, and produced in 1811. Scribe's dramatic pieces comprise all the departments of the lighter kind of drama, and from their gaiety and interest of plot, as well as the felicitous manner in which modern French life is depicted, have acquired a universal popularity in Europe, and have also been introduced on the English stage in translations. Among his vaudevilles may be mentioned 'Le comte Ory,' 'Le nouveau pourceaugnac' and 'Une visite à Bedlam.' He wrote for the Odéon, the Porte Saint Martin, and the Variétés theatres, but more especially for the Gymnase Dramatique, to which he furnished 'La maitresse du logis'; 'Malvina ou un mariage d'inclination'; 'Le mariage de raison'; 'Geneviève, ou la jalousie paternelle'; 'Maitre Jean, ou la comédie à la cour'; 'L'Amitié, ou les trois epoques'; 'Héloise et Abélard'; and numerous other pieces. To the Théâtre Français he contributed 'Bertrand et Raton' (1833); 'Le verre d'eau' (1840); 'Adrienne Lecouvreur' (1849) and 'Les contes de la reine de Navarre' (1850). In collaboration with Legouvé he wrote 'Bataille des dames' (1851) and 'Les doigts de fée' (1858). As a writer of opera librettos Scribe is also deservedly famous, having supplied composers with the text of the most celebrated of those produced at the Grand Opera and Opera Comique. Of these mention may be made of 'La dame blanche' (1825); 'Fra Diavolo' (1830); 'Robert le Diable (1831); 'La juive' (1835); 'Les huguenots' (1836); 'Les diamants de la couronne'; 'Les martyrs' and 'Le prophète' (1849). From the multiplicity of works with which he was engaged, Scribe, like other French authors, availed himself largely of the assistance of collaborateurs, and much, therefore, which bears his name was in reality only subjected to his revision and superintendence. In 1836 he was admitted a member of the French Academy.

SCRIBE, The, an early Egyptian statue now in the Louvre Museum, Paris. Colored red, and with inlaid eyes of crystal, it is regarded as one of the most characteristic illustrations of the art of the fifth dynasty.

SCRIBES, Jewish. Originally nothing more than copyists of the law, a business which they followed as a means of livelihood, the Jewish scribes gradually increased the importance of their position until, after the dissolution of the commonwealth, they became the vital force which determined the later form of Judaism. The importance of their office as doctors of the law and interpreters of the Scriptures is shown in many passages in the Old and New Testament. During this rise in the influence of the Jewish doctors they were known by five distinct appellations: (1) the Sopherim, or "Scribes." who guarded the Bible against corruption and who read the law; (2) the Tanaim, or teachers of the law; (3) the Amoraim, or doctors of the law; (4) the Saboraim, or teachers of the law after the conclusion of the Talmud; (5) the Gaonin, or last doctors of the law in the chain of rabbinic succession, the latter title being applied to the presidents of the colleges, which when assembled together explained difficult points in the Talmud, discussed and answered all ritual questions and enacted new laws for the regulation of the dispersed congregations.

SCRIBLERUS CLUB, The, a club organized by Swift in 1714. An association of writers, its object was the suppression of exhibitions of literary incompetence by means of satire. Pope, Gay, Bolingbroke and other authors of that day were prominent as members.

SCRIBNER, skrīb'nėr, **Charles,** American publisher: b. New York, 21 Feb. 1821; d. Lucerne, Switzerland, 26 Aug. 1871. He was graduated from Princeton in 1840, and in 1846 established with Isaac D. Baker the publishing house of Baker and Scribner, which after the death of his partner in 1850 became known as that of Charles Scribner and Company. *Scribner's Magazine,* founded by this firm in 1870, was purchased by other publishers and became the *Century Magazine* in 1881. A new *Scribner's Magazine* was established by the firm, known since the death of its founder as Charles Scribner's Sons, in 1887.

SCRIBNER, Frank Kimball, American author: b. New York, 22 Feb. 1866. He was graduated from Williams College in 1890, studied at Harvard Law School, engaged in literary work since 1903 and was for four years on staff of the New York *Sun.* He has contributed articles to current publications and has had published series of hunting and fishing stories, 'The Honor of a Princess' (1897); 'The Love of the Princess Alice' (1898); 'The Fifth of November' (1898); 'A Continental Cavalier' (1900); 'The Red Lion'; 'The Ravens of the Rhine'; 'The Secret of Frontellac.' He is a member of the Author's League of America, the Williams Club, the National Geographic Society, American Forestry Association and the Social Science Club.

SCRIBNER, Frank Lamson. See LAMSON-SCRIBNER.

SCRIP, *in commerce,* a term commonly used for a certificate of loans or shares in a joint-stock company, whether as a temporary acknowledgment or the permanent voucher of the holder's interest. Script may accordingly be either transferable or not transferable. The valid transfer of interest may be effected only by registration in the books of the company, or the transfer of the scrip itself may be held to represent a valid transfer of interest. *In heraldry,* a bearing representing a pouch or almoner. The word also means a scrap of paper or parchment usually with some writing on it, and during and after the Civil War in America was applied to the fractional paper money issued by the government of the United States.

SCRIPTURE, skrip'tūr, **Edward Wheeler,** American psychologist: b. Mason, N. H., 21 May 1864. He was graduated from the College of the City of New York in 1884. After pursuing his psychological investigations at the universities of Berlin, Leipzig and Zürich, he was called to Yale, where he became director of the psychological laboratory in 1898. In 1902 he became assistant professor of psychology there and four years later was made lecturer at Johns Hopkins. In 1909 he became lecturer on psychiatry at Columbia. He has attained distinction as the discoverer of a method of measuring hallucinations and processes of imagination, and as the originator of a method of producing insensibility by means of electricity. He is also known as the discoverer of the law of the "mediate association of ideas." His contributions to the literature of experimental psychology include 'Thinking, Feeling and Doing' (1897; 2d ed., 1907); 'The New Psychology' (1898; 2d ed., 1905); 'The Elements of Experimental Phonetics' (1902); 'Report on the Construction of a Vowel Organ' (1905); 'Researches in Experimental Phonetics' (1906); 'Stuttering and Lisping' (1912). In 1892–1902 Dr. Scripture edited the *Studies from the Yale Psychological Laboratory.*

SCRIVENER, skriv'nėr, **Frederick Henry Ambrose,** English Biblical scholar: b. Bermondsey, London, 29 Sept. 1813; d. Hendon, 26 Oct. 1891. He was educated at Trinity College, Cambridge, and from 1846 to 1856 was headmaster of Falmouth School and incumbent of Penwerris, retaining this living till in 1862 he was presented to the rectory of Gerrans, Cornwall. In 1870 he was appointed a member of the New Testament Revision Company, and in 1872 was granted a pension from the civil list in recognition of his services in connection with Biblical criticism. In 1875 he became vicar of Hendon, Middlesex, and prebendary of Exeter. He took high rank in the philological criticism of the New Testament, on which he published some valuable works, beginning with an edition of the Greek text in 1858, executed after collating about a score of unexamined manuscripts. His chief work was his 'Plain Introduction to the Criticism of the New Testament' (1861). He also published 'Cambridge Paragraph Bible' (1873) and 'Bezæ Codex Cantabrigiensis,' etc.

SCROFULA, a diseased state of the body characterized by usually indolent cheesy glan-

dular tumors which suppurate and imperfectly heal, leaving fistulous passages or ugly scars. It is also known as struma, scrofulosis, tuberculous adenitis and tuberculosis of the lymphatic system. It is a mild grade of tuberculous infection and should be treated as such. Sometimes internal organs, especially bones and joints, are attacked by a low grade of inflammation followed by a caseous degeneration. Scrofula was common in ancient and mediæval times. It was formerly called king's evil, and for centuries was treated by the touch of the kings of England and France. It is now less common than formerly, owing to better hygienic conditions. It is essentially a disease of early life, but may occur at any age. Formerly it was considered a hereditary form of tuberculosis; but before Koch discovered the bacillus of tuberculosis in 1882 scrofula was looked upon by many as a true tuberculosis, since miliary tubercles were found in the glands, as afterward were the typical bacilli. Modern medicine does not recognize any disease as scrofula. It is usually tuberculosis (q.v.).

SCROGGS, skrŏgz, Sir **William,** English jurist: b. Deddington, Oxfordshire, about 1623; d. London, England, 25 Oct. 1683. His name is a synonym for judicial injustice and cruelty. He was appointed chief justice in 1678 in which office his brutal methods and infamous partiality in conducting the trial of the victims of the "popish plot" soon made him notorious. He was impeached by the House of Commons in 1680 but was never tried but in 1681 was removed from his office by the king, who granted him a pension.

SCROPHULARIACEÆ, skrŏf-ū-lā-rĭ-ā'-se-ē, an order of herbs, sub-shrubs or shrubs widely distributed throughout the world. Some botanists estimate the number of species at 2,000, among which are many well-known garden flowers, such as foxglove, musk-plant, veronica or speedwell, snapdragon, calceolaria, eyebright, mullein and salpiglossis. Other species have been used in medicine and still others are considered poisonous. They are characterized by irregular personate or bilabiate flowers, arranged in racemes or spikes or in the axils of leaves; fruits either capsular or fleshy; and alternate, whorled or opposite leaves of various forms, generally scentless but sometimes fetid.

SCRUB-BIRDS, a family (*Atrichornithidæ*) of large, brown, harsh-voiced birds of the Australian forests, nearly related to the lyre-birds; also called brush-birds.

SCRUB RACE, in American political history. In 1824 in the Presidential campaign and election the candidates were not nominated by Congressional caucus, as had been the custom. Crawford, of Georgia, was put forward by a quasi-caucus; New England's candidate was John Q. Adams, Clay was nominated by Kentucky, Louisiana, Missouri, Illinois and Ohio; and Andrew Jackson by Tennessee and other States. Jackson received the largest popular vote, but Adams was chosen by the House.

SCRUB-TURKEY. See Megapodes.

SCRUPLE. See Weights and Measures.

SCUDDER, skŭd'ẽr, **Henry Martyn,** American clergyman and foreign missionary: b. Panditeripo, Ceylon, 5 Feb. 1822; d. Winchester, Mass., 4 June 1895. He was graduated from the College of the City of New York in 1840, and from Union Theological Seminary in 1843. From 1844 to 1857 he was a missionary to India from the Reformed Dutch Church of America, and again devoted his efforts to this cause in 1860–63. His later years were spent in various cities of the United States, where he held Dutch Reformed, Congregational and Presbyterian pastorates. In 1887 he established an independent Protestant mission in Japan, together with his son and daughter, who were also missionaries. He was the author of a 'Liturgy of the Dutch Reformed Church' (1862); 'The Bazaar, or the Vernacular Teacher's Companion,' etc.

SCUDDER, Horace Elisha, American author: b. Boston, Mass., 16 Oct. 1838; d. Cambridge, Mass., 11 Jan. 1902. He was graduated from Williams College in 1858, engaged as a teacher in New York for three years, and in 1867–70 he edited the *Riverside Magazine for Young People.* He then entered business life, but soon withdrew to devote himself entirely to literature. His juvenile publications, which were widely popular, include 'Seven Little People and their Friends' (1862); 'The Bodley Books' (1875–87); 'The Book of Legends Told over Again' (1899), etc. His work was not, however, confined to juvenile literature. He edited the *Atlantic Monthly* in 1890–98, and contributed much to it, though usually anonymously; edited 'American Commonwealths'; 'American Poems' (1879); 'American Prose' (1880), and wrote 'Life and Letters of David Coit Scudder, a Missionary in India' (1864); 'Noah Webster, a Biography' (1882); 'Men and Letters' (1887); 'James Russell Lowell, a Biography' (1901), etc.

SCUDDER, Janet, American sculptor: b. Terre Haute, Ind., 27 Oct. 1873. She was educated at the Cincinnati Art School, the Art Institute, Chicago, and at the academies of Vittis and Colorossi in Paris and at MacMonnie's studio there. She has lived abroad most of her life. She was awarded the bronze medal at the Chicago Exposition in 1893; and the prize medal at the Saint Louis Exposition in 1904. Her works include 'The Frog Fountain' (Metropolitan Museum, New York); 'Young Diana' (Paris Salon 1911); 'Little Lady of the Sea' (Paris Salon 1913); 'Fighting Boys Fountain' (Chicago Art Institute); and others at the Luxembourg, Paris; the Congressional Library, Washington; the Peabody Institute, and in other noted collections.

SCUDDER, John Milton, American eclectic physician: b. Harrison, Ohio, 8 Sept. 1829; d. Daytona, Fla., 17 Feb. 1894. He was educated at Miami University, Oxford, Ohio, and was graduated in medicine at the Eclectic Medical Institute of Cincinnati, Ohio, in 1856. In 1857 he was appointed demonstrator of anatomy and served as professor of obstetrics and diseases of women in his alma mater, 1858–60. From 1860 to 1887 he filled the chair of pathology and practice of medicine and from 1887 to his death the chair of hygiene, principles of medicine, physical and specific diagnosis. In 1869 he published the doctrine of specific medication, originated by him, and since that time the basis of practice of the eclectic school of medicine. For 32 years he was editor of the *Eclectic Medical Journal,* the oldest periodical devoted to American eclectic medicine. He wrote 'Practical Treatise on Diseases of Women' (1858); 'Eclectic Materia Medica and Therapeutics' (1860); 'The Eclectic Practice of Medicine' (1864); 'The Use of Inhalations' (1865); 'Domestic Medicine' (1866); 'The Principles of Medicine' (1867); 'Diseases of Children' (1867); 'Specific Medication' (1871); 'Reproductive Organs and Venereal Diseases' (1874); 'Specific Diagnosis' (1874). He was the most conspicuous eclectic physician of his time.

SCUDDER, Samuel Hubbard, American entomologist: b. Boston, Mass., 13 April 1837; d. 17 May 1911. He was graduated at Williams College in 1857 and at Harvard University in 1862. He was custodian of the Boston Society of Natural History in 1864–70, and was its president in 1880–87. He served as palæontologist on the United States Geological Survey in 1886–92. Author of 'A Century of Orthoptera' (1879); 'Butterflies' (1881); 'Fossil Insects of North America' (1890); 'American Fossil Cockroaches' (1895); 'Catalogue of the Described Orthoptera of the United States and Canada' (1900); 'Index to North American Orthoptera Described in the Eighteenth and Nineteenth Centuries' (1901), etc.

SCUDDER, Vida Dutton, American educator and author: b. Madura, India, 15 Dec. 1861. She was graduated from Smith College, Northampton, Mass., and studied at Oxford, England, and in Paris, France. She became connected with the formation of college settlements, was instructor in English literature at Wellesley College in 1887–92 and from 1892–1910 was associate professor when she became professor of that department. She is the author of 'How the Rain Sprites Were Freed' (1883); 'The Life of the Spirit in Modern English Poets' (1895); 'Social Ideas in English Letters' (1898); 'Introduction to the Study of English Literature' (1901); 'A Listener in Babel' (1903); 'An Introduction to the Writings of John Ruskin' (1904); 'The Disciple of a Saint' (1907); 'Socialism and Character' (1912); 'English Poems' (1915).

SCUDÉRY, skü-dā-rē, or **SCUDÉRI, Madeleine de,** French writer: b. Havre, 15 Nov. 1607; d. Paris, 2 June 1701. She gives an account of her early life under the name of "Sapho," the title assigned to her by her contemporaries, in her romance, 'Le grand Cyrus.' At 12, she says, she was spoken of as a person of mature judgment, and much admired. On coming to Paris she was admitted to the society of the Hôtel de Rambouillet, and began to assist her brother Georges, a writer of plays, romances and sonnets, in his literary labors. Her first romances were published in her brother's name, and he doubtless assisted in the formation of the plot, or at least suggested the plan of her works. The character of the works themselves is sufficiently explained by the circumstances of their production, but their protracted popularity is not so easy to understand. Her admirers range from Christina of Sweden to Mascaron, Fléchier and Massillon. Boileau himself did not dare to publish his satire during her lifetime. Her works may be regarded as a reflection of the society in which she moved. They consist chiefly of long romances replete with sentiments of love and gallantry; their predominant characteristic is affection.

The heroes of Mlle. Scudéry are the heroes of antiquity, Cyrus, Horatius Cocles, Mutius Scævola and Brutus. These and similar personages meet and discuss with appropriate heroines the anatomy of passion in endless conversations of the most refined subtlety.

The names of her characters were only a transparent mask behind which her readers saw and read themselves. The society of the Hôtel de Rambouillet furnished the originals for all the heroes of antiquity. Cyrus, it is well known, was the great Condé. The society of the day furnished her with endless materials and the gallantries of the preceding night formed the subject of the day's description. Thus with conversation, epistle, sonnet and madrigal she worked out a chronicle of petty intrigue under the greatest names of the world's history. After the reunions at the Hôtel de Rambouillet had been broken up by the troubles of the Fronde, Mlle. de Scudéry opened her own house to a select society on Saturday evenings. In this society, where everybody assumed a sentimental name, love was discussed, according to Mme. de Sévigné, in language so involved, that the speakers were ever in danger of being lost in their own mazes. The interminable conversations and meaningless gallantries which make her works dull at present were precisely what gave them interest when all her characters were known; and as she was admired and respected by those she portrayed, it is evident they were flattered by her portraits. Her principal works are 'Ibrahim, ou L'illustré Bassa' (1641); 'Artamène, ou le grand Cyrus' (1650); 'Clélie, histoire romaine' (1656). Besides these are numerous other romances, poems and 10 volumes of conversations and moral discussions. She obtained the prize in the first competition of the French Academy in eloquence for a 'Le discours de la gloire' (1671). See Clélie.

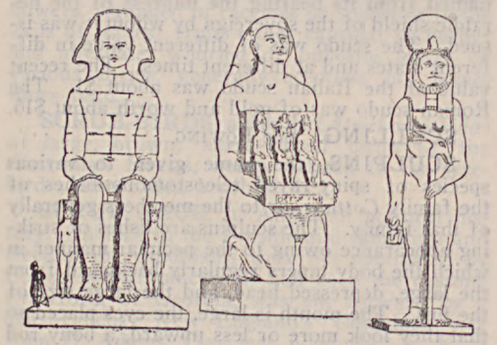
SCUDO, skoo'dō, an ancient Italian coin named from its bearing the impress of the heraldic shield of the sovereign by whom it was issued. The scudo was of different value in different states and at different times. The recent value of the Italian scudo was about $1. The Roman scudo was of gold and worth about $16.

SCULLING. See Rowing.

SCULPINS, the name given to various species of spiny-rayed teleostomous fishes of the family *Cottidæ,* or to the members generally of that family. The sculpins are fishes of striking appearance owing to the peculiar manner in which the body tapers regularly backward from the large, depressed head, and the large size of the fins. The mouth is large, the eyes placed so that they look more or less upward, a bony rod runs across the cheek between the suborbital and the preopercular bones, and the bones of the head are ornamented in varied fashions with numerous ridges and spines. The skin is largely naked but is often provided along the lateral line and elsewhere with bony plates or spines. All of the fins, and especially the pectorals, are of large size and the latter has a remarkably extended base of attachment. The family is a large one, embracing more than 60 genera and 250 species. Most of the species

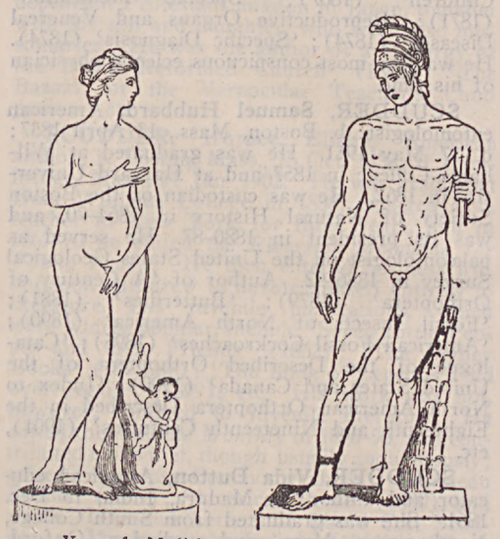
live in the northern seas among rocks in shallow water, but some remarkable forms live in deep water. Some small species inhabit fresh waters. All are of small or moderate size and are little used for food. Among the numerous North American species the best known is the common or big sculpin (*Myoxocephalus grœnlandicus*). This species reaches a length of two feet, but is usually smaller and is abundant in the North Atlantic, on the American side as far south as New York. In the far North it approaches the coast from the deeper water in summer, but on our shores is most plentiful during the winter spawning season. The eggs are laid in large masses attached to seaweeds or rocks. Sculpins are exceedingly active and voracious and devour all kinds of animals dwelling on the bottom. The sea-raven (*Hemitripterus americanus*) (q.v.) is another noteworthy member of this family. Of the fresh-water sculpins the miller's thumbs (*Cottus*) are represented by numerous species of little fishes which dwell among stones in cold springs, brooks and lakes, laying their eggs in masses on the under side of stones and guarding them until hatched. Consult Jordan and Evermann, 'Fishes of North and Middle America' (Part II, Washington 1898); Goode and Bean, 'Oceanic Ichthyology' (Washington 1895); Gill, T. (in *Smithsonian Miscellaneous Collections*, Vol. II, Washington 1904).

SCULPTURE is the art of shaping figures either in the round out of or in relief upon various durable substances. This shaping is accomplished by modeling for wax or clay; by carving for wood, stone, marble and ivory; and by casting for plaster and bronze. The modeling of a small figure in wax — to make trial of the general effect — and of a full-sized one in clay form the first steps in life-sized or other large-scale sculpture of human subject; and these are comparable to the sketch in painting. In very large work, the wet clay is worked onto a rough framework of iron bars and coarse wires by means of the fingers aided with wooden and iron tools; and consequently allows



Egyptian.

great freedom of change in every detail. The small wax figure is fashioned with little or no use of a human model, but the full-sized figure is usually executed either in constant presence of one or with very frequent reference to it; not indeed to copy the living form, but to insure a general truth or keep a hold upon the possibilities of life. Furthermore, in full-sized work, even the draped figure is very generally modeled nude, in the first place, in order to secure harmony of action between the various members whether hidden or exposed. Thus, the legs must lead to the body, as the body to the head if the figure be seated; and legs must anatomically support the body if the figure stand. The modeling must combine with this living reality such abstract beauty as is possible in the case. The plaster cast which is taken



Venus de Medici. Achilles.

from the wet clay model is often retouched by its sculptor. Transference into marble is made by a marble-cutter aided by a pointing machine, and usually supplemented by the artist's own hands. Reproduction in bronze is done by casting in a mold, which has been made upon either model or cast, for all but colossal works like the Liberty in New York harbor, which are made from hammered plates. The bronze may be left its natural color, or be stained or gilded. The tough and durable bronze, which moreover can be cast hollow, is preferred to the brittle and — in cold climates — disintegrating marble for out-door use. But for interiors the merits are divided; the pale marble makes even delicate transitions of light-and-shade effective, while its translucence imparts softness to the exquisitely rounded surface; but the dark and opaque bronze obscures these qualities, and therefore calls for emphasis of projections and sharpening of corners to impart clearness to their shadows. Ivory in plates was sometimes used for the fleshy parts of draped statues, and ivory is now used for statutettes. Wood is used extensively in China and Japan, where its liability to warp and split is obviated by the use of smaller pieces glued together and by lacquering.

Sculpture in relief is used mostly in architectural decoration where its aid is invaluable to relieve the flatness on frieze, panel, or pilaster. In low or bas-relief, the figures project less than half the rounded form, usually much less; whereas in high-relief they exceed that limit, and then often show heads, arms, etc., wholly detached, and other parts so undercut as to appear detached. Of course, there is a

middle-relief between high and low, and sometimes figures are merely outlined by a groove. Relief and background are usually of the same material, but may properly be diverse.

The beauty of sculpture may be analyzed as follows: Though the mass of sculpture matters less than its form, the heroic size befits the grand subject, and pieces destined to elevated or remote location must be enlarged to correspond, and at the same time changed in the proportions of their parts and trimmed of details. Since sculpture has the third dimension of thickness, it may be enjoyed by touch as well as by sight, precisely as acquaintances are recognizable by a blind person, and finely modeled statuary has been so appreciated in privileged cases. This solidity also renders possible an endless variety of aspects, according as the observer changes standpoint. The surfaces of the animal or human body — which commonly form the objects of sculpture — are exquisitely rounded in every direction, and the outlines which become visible when we look at these surfaces against a background are mostly curves of consummate beauty, combining lines nearly straight with others of greatest flexion; and the Philistine needs to learn that those on foot or nates are in no wise inferior to those on shoulder or head. These curved surfaces, moreover, can be expressive of underlying substances as varied as bone, sinew, muscle, flesh and veins; and when they are so, the surface is said to be sensitive, but when they are not, then puffy or monotonous. Contrast is secured by means of massively rounded forms, as of the nude, against the sharp folds of drapery and crisp locks or wavy tresses. Unity among this variety is secured by dominant lines, as in the Discobolos of Myron, where an approximate semi-circle may be traced from the discus, along the right arm, across the shoulders, down the left arm and left leg, to the left foot; while the bowed trunk and bended right leg show a zigzag quite as plainly.



Niobe.

The effect of the single color in bronze and of the absence of color from marble and plaster is to concentrate attention on the form and line of sculpture, which on that account is enjoyed by certain temperaments more than is painting, and can be utilized by all as special opportunity for a revel in line. But the injury both given and received by a large patch of white among the colored objects of a picture gallery or parlor is undeniable, and should be remedied by investment of the marble statue or relief with some warm tint, as was apparently the practice of the Greeks at all periods. Failing such remedy, the distraction of the gleaming and ghostly marble should be precluded by assigning to it a separate recess or room. But in general the tinting is preferable, since sculpture can then be admitted to the company of flat walls and pictures which its projection will greatly relieve, while they also aid it. Statues and reliefs never appear to such disadvantage as when jostling each other in a store or museum, where numbers satiate, rivalry discounts and nothing serves as a foil.

The element of light-and-shade becomes important in that mainly through it form is revealed to the eye. This in turn requires that the sculpture should be modified to suit the lighting available, namely, as it comes from either side, from the front, or from above; while of course it should never come from the back, though statuettes placed in windows cause that very effect. A brilliant play of such light-and-shade is the only peer to beauty of line in sculpture; and is often referred to by sculptors under the misnomer "color," as if to make amends thereby for the absence of color from modern sculpture.

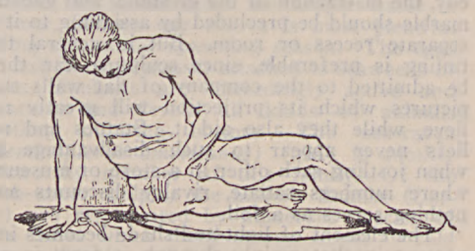
As in all other arts, worthy meaning or significance should be wedded to the beauty of



Papirius and Mother.

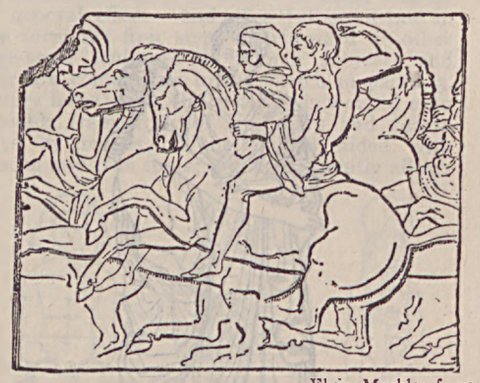
sculpture; but here the case has peculiar strength. Since sculpture is solid, it must fully express or exhibit the form of whatever it shows, whereas painting can merely suggest an object, which is indifferent or repulsive in itself, and throw around it the glamour of light or color. Sculpture is, therefore, limited to such subjects as are capable of exciting interest

by their forms taken separately, although it must not be forgotten that form is explained to the eye by delicate gradations of shade, the surfaces seeming tinted in this way as they receive light more or less directly. The nobler animals, and especially man in the typical activities that become him, form the subjects of the separate or independent sculpture most in fashion in the 19th and 20th centuries. Sculpture of such character as this is necessarily the highest in rank. This characteristic of sculp-



The Dying Gaul.

ture reaches its maximum in the undraped human figure, which must, therefore, belong to the noblest type both physical and mental, that is, in both beauty and significance; but when it so does, proves a very gospel of art in the uplift to finer sense and sentiment which it elicits from the normally minded observer. Sculpture is also the noblest of the decorative arts as well as that the most constant in use in all ages. Architectural sculpture occupies itself largely with vegetal forms, mingling with them animal and human forms freely treated;





Elgin Marbles from the Parthenon, Athens.

and finds its highest reach in the nobly designed human form with its drapery, as in the Caryatid porch of the Erechtheum and the portals of Rheims cathedral.

Egyptian sculpture, whose first monuments date from the fifth millennium B.C., forms, with that of Chaldea-Assyria, the two tap-roots for subsequent tradition in Europe. Tomb and temple are responsible for the great mass of Egyptian sculptures. Religious belief held that survival of the *ka* or spirit after death depended upon preservation of the body (as a mummy), or failing that, upon provision of a *ushabti* or sculptured portrait. Scenes from the past and future life of the deceased were also sculptured upon the wall of his tomb. Temples were covered within and without with scenes from the victories and consequent offerings to the god made by a king. The workmanship on some of the hardest stones known was superb and achieved only with immense toil, to lessen which the statue was generalized as much as possible, though at the same time made to express the salient traits of the subject. The *ushabti*, on the other hand, called for a realistic portrait, and this was achieved in the softer material with great skill. All of the reliefs and most of the statues received a decorative coloring. Curious conventions gave part of a figure in profile, but part full face; and principal objects, like gods and kings, were represented larger than their fellows.

Chaldæan sculpture showed great technical skill as early as the fourth millennium B.C. The tomb had little importance, since the corpse was burned, but temples sheltered idols in stone, and palaces contained demoniac images, royal statues and historical stelæ. Stone was used for the larger pieces, terra-cotta for the smaller. The Assyrians adapted Chaldæan art traditions, but gave chief attention to the palace where reliefs depict a king in war or the chase. The style excels in vigor and movement especially in the representation of animals, but lacks variety and ignores the life of woman. The art of Egypt and Assyria was carried by the Phœnicians both eastward and westward, and proved of special moment in the development of the Greeks.

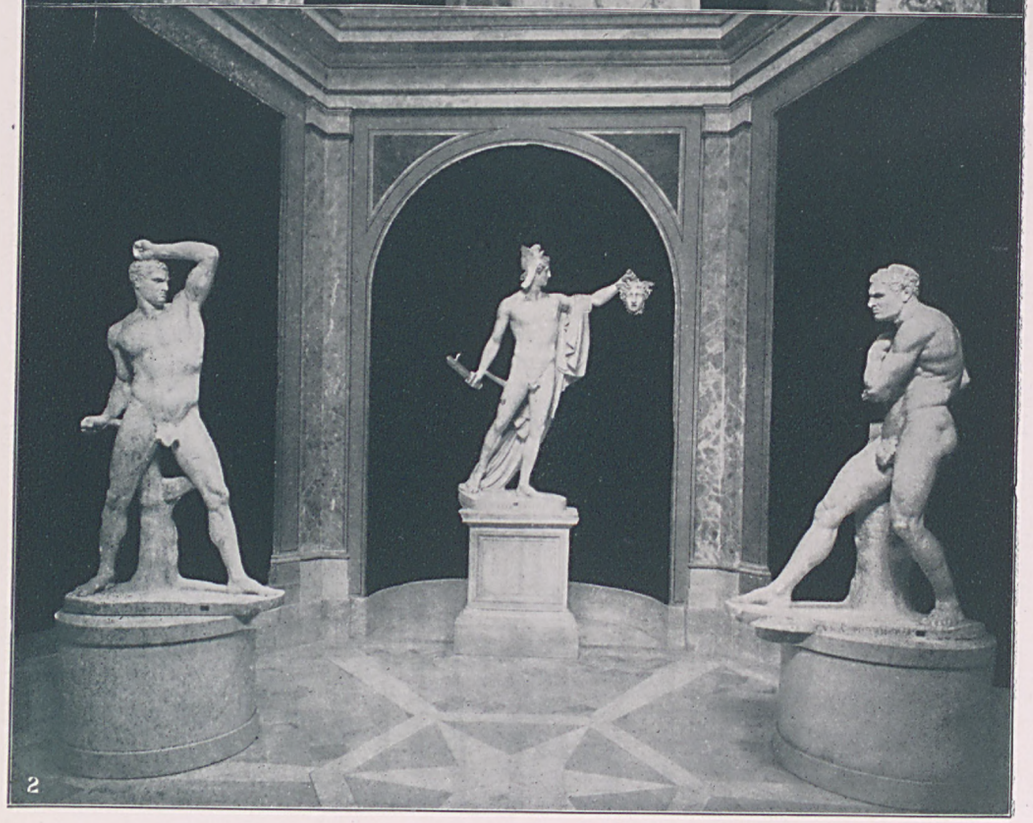
The wide distribution of the Greeks in Europe, Asia and Africa combined with their tribal distinctions to favor a healthy rivalry in the arts. The largest and chief classes of sculpture consisted of, first, free statues, some of which were representations of divinities, others votive offerings, portraits set up at tombs and the like; and secondly, temple reliefs, but there also appear civic monuments and others celebrating the life of a sovereign or statesman. Terra-cotta figurines with mythological and sometimes grotesque subjects, were fashioned for the home, and stelæ (sculptured slabs) to mark the resting place of the departed. Statuary of rough material or crude execution was colored generally, as where the terra-cotta statuettes have their garments colored throughout, but finer works received intense color to express or emphasize details, as the border or pattern of a cloak, while a tint was spread over the whole. Gold, silver and bronze were both



1 Perseus 2 Apollo Belvidere 3 Discus Thrower 4 David



1 The Muses in the Vatican Museum



2 Famous Statues in the Vatican Museum

hammered and cast into statues, which were then variously inlaid and provided with realistic eyes. Wood was carved and then painted or else covered with metal plates; and wooden figures made to be covered with drapery were fitted with heads and hands of finer material. Terra-cotta, which ranked with wood as the earliest material used for sculpture and largely in architectural accessories, was also painted in



Hebe—Thorwaldsen.



Venus—Canova.

part or whole. In all Greek sculpture, therefore, the finished work was polychromatic.

Crude statuettes remain from a Greek prehistoric stone age, 2500–1500 B.C., and stone reliefs from the Mycenæan bronze age, 1500–1000 B.C. Incursions of Hellenic tribes from Thessaly led to transition and progress, until by the 6th century sculpture in marble and bronze had become a national art, of which there were two types. The Ionic preferred rounded forms, slender proportions, light draperies revealing the figure; and organic groups. It quickly developed the draped female figure. The Doric type shows sturdy, muscular forms, heavy draperies and figures merely juxtaposed. It developed the nude male figure. But Athens drew sculptors from both sources, and thus combined grace and force to form a third school, the Attic. The 5th century witnessed achievement of a mastery that allows interest in prior work elsewhere only in so far as it contributed to this, and that has remained until this present time a source of perennial delight and instruction. We are told that Polykleitos brought his athlete carrying a spear, the Doryphoros, to such perfection as to furnish a canon or standard for all such subjects. Myron showed fine naturalism in his Discobolos, and the artists who worked under the direction of Phidias combined figures of unsurpassed dignity and beauty into coherent compositions, such as those on the pediments, metopes and friezes of the Parthenon. The 4th century saw a movement toward slender proportions and graceful line, especially with Praxiteles, as in his Hermes and the Aphrodite of Knidos. The Apoxyomenos of Lysippos, probably well represented by the marble statue in the Vatican, which is assumed to be a copy of the lost original, shows the same qualities, in contrast to the Polykleitan canon. Scopas is said to have excelled in expression of spirited action whether as boar hunt or bacchante. The Aphrodite of Melos, in the Louvre, free equally from shame and coquetry, and uniting superb form with facial expression, belongs to this or a century later. The 3d and 2d centuries saw the diffusion of Greek art over the known world, and the various modifications consequent upon it. The friezes on the altar of Zeus at Pergamon exhibited originality of design and vigorous action; and akin to them are such statues as the Apollo Belvedere, the Diana of Versailles and the torso of the Belvedere. The group known as the Laokoön belongs to the same general type and period, the ripe autumn of Greek art, but not in any sense a degeneration.

The Romans as a race were deficient in plastic sense. Sculpture appealed chiefly to their personal ambition as portraiture, which under the early empire reached a realistic perfection never before attained Relief was the next most



Michael and Satan—Flaxman.

practised branch of sculpture, and reached great excellence as decorative art and as commemorative representation, in such monuments as arches and columns, especially those of Trajan. Roman taste for imaginative sculpture depended almost entirely upon Greek sculptors resident in Rome and upon Greek masterpieces, which were transported thither in great numbers from the entire Greek world. Finally, sculpture de-

clined along with the Roman Empire, until in the 4th century A.D. not even fair copies could be made.

Early Christian art, which extends from the 3d to the 6th centuries, found use for sculpture only on sarcophagia, where scenes from the Old Testament were depicted in high relief by artisans rather than artists. What the barbarian incursions did to break the continuity of artistic tradition in the West was accomplished in the East by the Iconoclast persecutions, so that Byzantine sculpture from the 7th to the 9th century calls for no further notice.

Mediæval sculpture, from the 8th to the 14th centuries, had various fortunes in Italy and the North. In Italy it was applied as relief to the decoration of church furniture such as pulpits, altars and fonts; whereas in France and Germany both reliefs and statuary formed an integral part of the Gothic architecture on portal and façade. Sculpture, founded upon classical models, was revived in Italy near the middle of the 13th century, under the leadership of Niccola Pisano. His son, Giovanni, felt the influence of northern schools and introduced thence the allegorical and symbolic qualities of Gothic. His successor, Andrea Pisano, led the Gothic school in Italy to the highest excellence it attained. His breadth, vision and technique transformed sculpture precisely as these qualities in Giotto did the contemporary painting. The worthy successor of Andrea Pisano was Andrea Orcagna, a genius who gave less attention to sculpture than he did to its related arts.



Victory — Rauch.



Caractacus — Foley.

The splendid development of stone sculpture in France, from the 11th to the 14th centuries, occurred in its application to the exteriors of Romanesque and notably of Gothic cathedrals. Front and side portals and façade niches were crowded with life-sized or colossal statues, while archivolts and tympana were filled with high reliefs. This subordination of sculpture to architecture involved loss of freedom and sacrifice of details, but the earlier severe stiffness had been overcome by the 13th century, when new buildings were in progress all over northern France. The thousands of figures on such cathedrals as Chartres, Rheims, Amiens and Notre Dame were planned to visualize the encyclopedia system of mediæval theology. Almost no artists' names are known, and the scanty data indicate that while the ablest masters went to nature and to human models, both nude and draped, the mass of sculptors followed canons of form and pose prescribed for them by these masters, who must also have superintended the whole composition. These French sculptors of the Gothic period acquired the same technical mastery over stone as did the Greeks of the best period; and, like them again, were fond of polychromy, though this has only lately been recognized by historians of art. French sculpture of the late 13th and the 14th century loses in dignity, but gains in charm, humor and dramatic effect.

Mediæval sculpture of stone achieved no such results in Germany as it did in France, but excelled all other European countries in metal sculpture for church furniture, as it did also in goldsmith's work, where it followed early Christian and Byzantine models. In the 12th century German sculptors applied stone statuary to the enrichment of cathedral interiors, especially about the choirs; and in the 13th century, under French influence, extended this enrichment to the exterior, but the figures were both fewer and soberer, copying French lightness and grace only in the Rhenish school. About the middle of the 15th century, naturalism in wood carving for altar-pieces, etc., displaced the formalism of this architectural sculpture.

The Renaissance in sculpture, as in the other arts, took place in Italy, whence it was carried to other countries. Powerful families now displaced the community in patronage of art, just as the single artist did the school in its production. Associated with this individualism was the naturalism that showed itself both in the choice of contemporary subjects and in change from a conventional to a naturalistic treatment of forms. Both were powerfully promoted by the revival of classic subjects and forms, which is signified by the term Renaissance. In point of form, however, the modern sculpture was more nearly pictorial than the classical as a whole. The 15th century was one of transition, the 16th felt the full sway of the new spirit. In both these centuries the subjects most in demand remained religious for the lavish decoration of churches both exterior and interior, in both relief and the round. But squares and gardens, palaces and houses, also shared in the exuberance of restored art. The religious subjects were of necessity drawn from the Scriptures and the legends of the saints, with the Madonna and Child by far the most popular. But civic and domestic sculpture frequently employed classic themes, and wealthy persons resumed the Roman practice of collecting antiques. Bronze came again into general use, and the demand for refined form favored marble among the stones. The intensity of white marble was toned down by use of wax, and details such as hair and ornaments were usually gilded. Terra-cotta and the still cheaper stucco displaced marble in works destined for

country towns; and reproductions of masterpieces often reached the common people by this means.

Only the chief sculptors can here be selected for brief notice. The leadership among eight distinct schools of sculpture during the 15th century was held by Florence. Its masters during the first half of that century were Ghiberti, Donatello and Luca Della Robbia. Ghiberti's



English Gothic Sculpture.
From Peterborough Cathedral. From York Cathedral.

masterpiece was the bronze doors for the baptistery at Florence in which sculptural perspective and harmonious composition called forth Michelangelo's encomium. Robbia showed masterly composition in his choir-gallery reliefs, and founded a school of glazed terra-cotta sculpture. Florentine masters during the late 15th century were Desiderio da Settignano, Benedetto da Majano, and Mino da Fiesole in marble, and Verrocchio and Pollajuolo in bronze. Desiderio was distinguished for a harmony and refinement much emulated by his contemporaries. Verrocchio's masterpiece was the equestrian statue of Colleoni in Venice, reputed to be the finest extant. The Milanese school indulged a taste for luxuriant decoration in terra-cotta, and the Venetian for rich, graceful forms that appealed to emotion.

The high Renaissance, nearly conterminous with the 16th century, brought to sculpture an influence over its sister arts of architecture and painting that it had never before enjoyed. This sculpturesque treatment went to excess when statuary overbalanced the architectural construction of a wall tomb or even of an entire façade. In sculpture itself dignity of design yielded its late prominence to modeling of surface, posing of arms and legs, and the movement of drapery, all aimed at greater effectiveness. Other artists of the period were overshadowed by Michelangelo Buonarroti, a master equally of architecture, sculpture and painting, but sculpturesque in all; for his dominant interest was with the nude human form. His chief sculptures in his best manner are the Moses, the Two Slaves and the Medicean tombs at Florence. Each is but member of an incomplete whole. The freedom of modeling developed in marble by Michelangelo was paralleled in bronze and goldsmithy by Benvenuto Cellini and Giovanni da Bologna. Cellini's masterpieces consist mostly of smaller decorated objects, but larger works are the Nymphs at Fontainebleau and the Perseus at Florence. Bologna treated classic themes with great freedom and grace. During the decadence of the 18th and 19th centuries, sculpture ran riot in Italy, both as to quantity and quality. Dignity and repose were displaced by dramatic emotion and movement. Lorenzo Bernini swayed 17th century sculpture by pandering to this theatrical taste.

The Renaissance in other countries than Italy was no rebirth, but simply an importation of the new Italian style and modification thereof by the national spirit. In France, where the splendid Gothic impulse had not yet expended itself, magnificent work was done by such sculptors as Michel Colombe, Ligier Richier and the unknown artists of the churches at Abbeville and Saint Riquier; but the Italian style found a welcome in the actual person of numerous Italian sculptors. The 16th century witnessed the transformation or erection of great châteaux, public buildings and churches, all of which called for sculptured decoration after the early Renaissance style. The great sculptors in this work were P. Bontemps, J. Goujon and G. Pilon, among whom Goujon especially displayed the new harmony and elegance. In the 17th century the tendency was to superficial pomp of the Versailles type, which characterizes the work of F. Girardon and P. Puget and of their successor, N. Coysevox, at the beginning of the next century. This



Night — Schilling.

grand art of Louis XIV was succeeded by one of grace and delicacy in the course of the 18th century, when J. B. Lemoyne, E. Bouchardon, J. B. Pigalle and J. A. Houdon did their work, the last named especially in portraiture.

The Renaissance movement in other countries offers little interest. In Germany it reinforced the naturalistic movement already begun there, but was accepted slowly especially

in the northern part where Gothic influence from the Netherlands continued. In the 16th century forms peculiar to Flemish Renaissance mixed with those of the Italian throughout Germany, and in the 17th and 18th centuries the Rococo style of the Romanists shared the field with the bareness of the Protestants.

The Netherlands combined Italian with its native style in the 16th century; Austria followed in the wake of Germany; while Spain and England depended upon imported Italian artists, until the 17th century, when native sculptors appeared. In England, N. Stone supplied sculpture for many buildings designed by Inigo Jones, as did G. Gibbons for others by Sir C. Wren. All important English works of the 18th century were executed by Flemish or French sculptors, but toward its close John Flaxman started a home revival by his exquisite reliefs for Wedgwood pottery.

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EDMUND BUCKLEY,
Editor of 'University Lessons on Art.'

SCULPTURE, Education in. We know little of the education of the sculptor in ancient Greece, and can only guess at the training which produced the greatest sculptors the world has seen. In the Middle Ages and the Renaissance education in sculpture proceeded on much the same lines as education in painting, the young sculptor entering the workshop of a master and learning thoroughly all the mechanical parts of the trade before he attempted anything in the way of independent study of nature. To-day the education of the sculptor is organized in the same way as that of the painter and the student has much the same training in the observation of nature and much the same lack of training in the essentials of art. There are, however, certain differences between the conditions under which sculpture and painting are carried on in modern times which seem to favor the education of competent craftsmen in sculpture. The mere bulk and weight of material involved in the creation of heroic statues or groups makes it inevitable that the sculptor should have some assistance, and most prominent sculptors are more like the heads of mediæval shops than are almost any modern painters. Apart from the more or less illegitimate employment of what are known as "ghosts" (that is, artists, often, of more ability than the employer, who actually produce the work for which the employer secures the commission and appropriates the rewards), a sculptor may have a corps of perfectly legitimate helpers who vary from the mere studio boy of the caster to the accomplished modeler. Many young sculptors thus pass through the studios of their seniors and gain invaluable experience in the actual production of works of art which is supplemented, either before or afterward, by education in a regular school of art. Such a double training is the best our time has to offer, and is certainly far better than either an apprenticeship or a term of study in an art school taken singly, but it is not yet an ideal training.

The technique of sculpture, as far at least as regards the handling of the clay or wax model, is an infinitely simpler thing than that of painting. There are no complicated processes to master, no questions of the chemistry of pigments, of the optical effects of colors on each other or of the different qualities of reflected and transmitted light, such as are involved in the manipulation of paint. Modeling is a matter of knowledge of form and facility of hand, and both the knowledge and the facility might be attained as readily in the school as in the studio, for there is so much rough manual labor to be done in a sculptor's studio that a helper might work there for years without doing much real modeling. And the technique of modeling is, after all, of relatively little importance; for the sculptor, unlike the painter, puts his personal handiwork upon a thing destined to be destroyed and never to be seen by the public. He works in clay or wax while it is the interpretation of his work in marble or bronze that is set before the world, so that he is almost in the position of the draughtsman upon the wood block, whose work ceases to exist and is replaced by that of another. The sculptor of the Renaissance was either a stone carver or a bronze founder or both, and the craft he practised was the craft of carving or of metal working, the modeling being only a preliminary and being sometimes dispensed with altogether. The modern sculptor tends to become a modeler and to put all his strength into the clay, the final carrying out of his ideas being largely entrusted to others, and his knowledge and invention count for much more than his skill of hand, while the worker in stone or bronze rarely becomes an original artist. Of course the best of our sculptors do not only control and oversee the final carrying out of their work, but actually put hand to it themselves, at times, and even when they do not they must vary the manner of modeling they employ according to the material of the definitive work, and these variations of manner they will teach their assistants. Also there is a great deal to be learned in a sculptor's workshop hardly likely to be picked up elsewhere, were it only the mechanics of setting up great armatures, the processes of pointing and enlarging small models and the rest. Still there is some tendency to a divorce between the original artist and the workman, and it is difficult for the modern sculptor to become a thorough master of his craft, thinking naturally in stone or bronze rather than in clay.

There is another respect in which the education afforded by the apprenticeship of the Renaissance was greatly superior to that obtainable in a modern studio. The Renaissance master was often a painter as well as a sculptor and, not infrequently, an architect as well, and the essential unity of the three great arts of design was inevitably impressed upon his pupils. The modern sculptor rarely knows anything of painting or architecture, and his studio assistant has little opportunity even to learn drawing, the foundation of all the arts. If he would learn to draw he must study in an art school, and he is generally encouraged to do so in such time as his necessary work leaves at his own disposal. In the modern art school the students are allowed, or even required, to change from class to class, and their chance of acquiring some notion of the interdependence of the arts, and some breadth of artistic culture, is greater than that of the mere studio assistant. Such interchange of work between drawing or painting and modeling would be of great benefit to the painter also, if he more often took advantage of it, but is hardly as essential to him as to the sculptor.

In some measure, then, the schools offer a valuable supplement to the training of the studio, but they do not give nearly all that they might or should give. Of the true meaning of composition, and of the difference between artistic expression and imitation, the school, at its best, can give no such idea as can the studio, where the actual production of a work of art, through all its stages, may be watched. Yet the students might be encouraged and aided in the actual carrying out of original work, taught something of the difference between the use of the model for the attainment of a predetermined result and the mere copying of a set pose, and, possibly, instructed in casting, pointing, marble cutting and even bronze founding and chasing and the production of various patinæ. He should, assuredly, be given a thorough training in ornament and be taught more than he is of the history of art and the development of styles. A thorough mastery of drawing cannot be too much insisted upon. Of course the constant study of modeling from the living figure would continue to be the principal element of training, but it would be well if some study of drapery and costume could be added to it. The graduate of our art schools, either painter or sculptor, generally knows little or nothing of the arrangement of draperies and this is one of his most serious deficiencies.

Such a course of instruction as is here sketched has been attempted, but has never been thoroughly worked out in our schools. It could hardly fail to prepare the student for more efficient service in the studio of a master than he is now generally able to give, and to enable him to acquire more surely and rapidly that practical knowledge of real work which no school, however managed, can supply. See ARCHITECTURE, EDUCATION IN; PAINTING, EDUCATION IN.

KENYON COX.

SCULPTURE OF THE 19TH CENTURY. The beginning of the 19th century found classicism dominant wherever the art of sculpture was practised. Canova, now 43, was the recognized leader and was destined to hold his position as an amiable dictator until his death, 22 years later. Thorwaldsen was already in Rome acquiring the elements of his more virile art. The works of the antiquarian Winckelman had been translated from the German into various languages and with the etchings of Piranesi had carried the worship of the antique into distant lands. All Europe was "doing Greek," as it fondly imagined. Simplicity was the watchword; a simplicity which to-day seems as amusingly ostentatious as the theatrical art which it displaced. Canova was followed by a large brood of disciples of whom Giuseppe Fabris alone requires mention. The realistic impulse of the time was represented by Lorenzo Bartolini (1777–1850), whose sculpture, while often literal, revealed a new vitality. Pietro Tenerani also left works of interest. The first really to belong to the 19th century was Giovanni Dupré (1817–82), who was strong enough in personality to put soul into his very realistic works. Giulio Monteverde likewise struggled to express ideality in terms of realistic imitation. Antonio dal Zotto, of Venice, a pupil of Ettore Ferrari of Rome, made many public monuments, among them his vivid 'Goldoni' of Venice. Vincenzio Vela (1820–91), whose naturalism was liberally leavened with imagination, is best known to us through the 'Last Days of Napoleon' in the Corcoran Gallery. Of contemporaries, Vincenzo Gemito (b. 1852) is typically Neapolitan, while Ernesto Biondi (b. 1855) has run the gamut of subjects and treatments from 'The Saturnalia' to 'Les Recluses Misérables.' Most idealistic of all modern Italian sculptors is Lorenzo Bistolfi (b. 1859), of Turin, "the poet of Death," whose 'Grief Comforted by Memory,' and 'Sacrifice' — the latter on the national Victor Emmanuel Memorial at Rome — show forth the beauty of his sculptural thoughts.

In France the opening of the 19th century found the great master Houdon at the age of 59 still producing those vivid portraits which have made his fame. His airy 'Diana,' the ever admirable 'Voltaire' and the stately 'Washington' of Richmond, Va., had been completed, however, a few years earlier. Among the orthodox classicists of the time were Bosio, Cortot, Chaudet, Giraud and Pradier, all men of skill but with little to say. Their art seems to us singularly colorless and anemic. Three names stand pre-eminent in the first half of the 19th century: David d'Angers, Barye and Rude. Pierre Jean David (1789–1856) — called "of Angers" to distinguish him from his namesake the painter — is remembered for his hundreds of medallion portraits of contemporaries and for the austere pedimental group of the Paris Pantheon. Antoine Louis Barye (1796–1875), the great interpreter of animal life, was a patient and perhaps unconscious revolutionary. Coming in a period of convention, no less exacting in matter of themes than in manner of treatment, his novel works were inevitably met with disapproval. Following an untrodden path, he made no mistakes; whatever he touched became true sculpture. Before his death his recognition was complete. The greatest personality of this period was François Rude, who was born at Dijon in 1784 and died in Paris in 1855. Rude imagined himself a classicist and tried to be one; but his art at times transcends schools, and once at least he becomes sublime. 'The Departure' upon the Arc de Triomphe (1832–35) is the greatest achievement, the most inspired work ever wrought by a French sculptor. Rude's brilliant pupil, Jean Baptiste Carpeaux (1827–75), worked with a feverish touch and threatened to

set all of the statues of Paris a-whirl on their pedestals. 'Flora' of the Tuileries, 'The Dance,' of the opera, and the crowning group of the Fountain of the Observatory are the most important examples of his restless but fascinating art. Another pupil of Rude to win eminence was his nephew, Emmanuel Frémiet (1824–1900). Like Barye he was known as an animalist, but he modeled the human figure with complete authority. His various startling tragedies of the jungle are well known, but a more lasting fame will be based upon his equestrian 'Joan of Arc' and particularly his 'Louis d'Orleans' of Pierrefonds Castle.

A great quickening of sculptural activity was destined to follow the modest and almost reticent leadership of Paul Dubois (1829–1905). Chancing to find his *métier* too late to aspire to the Prix de Rome, he went to Florence for independent study and there was profoundly impressed by the art of the 15th century, especially the works of Donatello and Jacopo della Quercia. In a sense he re-discovered this period to France. He modeled and exhibited in 1865 his 'Young John the Baptist,' its cordial reception being soon shared by the well-known 'Florentine Singer.' As a result he was entrusted with a very important commission, the tomb of General Lamoricière for the cathedral of Nantes. Completed in 1878, this work received in the exposition of that year the highest honors, and Dubois was recognized as the head of a new movement distinctly inspired by the early Italian Renaissance. Men of like sympathies grouped themselves around him, and the '70s and early '80s saw a succession of notable works from such masters as Henri Chapu ('Joan of Arc'); Ernest Barrias ('The First Funeral,' 'The Defense of Paris'); Eugène Delaplanche ('L'Aurore,' 'La Musique'), and René de Saint-Marceaux ('Genius of Death Guarding the Secret of the Tomb'). Alexandre Falguiere constantly oscillated between themes spiritual and themes «frankly carnal.» Antonin Mercié, another gifted southron, had sent his 'David' from Rome in 1872 and followed it in 1875 with his 'Gloria Victis,' a distinctly national expression. With these men as leaders and an army of others trained as only French scupltors are trained, the art assumed an unwonted importance, attracting the attention of the world. Some have even claimed that this manifestation was worthy to be called the third of the great historic epochs in the history of sculpture.

Strength is ever followed by decay; virtuosity takes in time the place of inspiration. No advance is ever so successful that it has not an opposition movement in its shadow. Some of these great artists became careless in their work. Some stopped thinking, although their wonder-working hands toiled on. Nearly all of them made regrettably incoherent public monuments in the style of Dalou's dizzy 'Delacroix.' Their followers were left in a particularly sad plight with no one to think for them. Between an art of meaningless vehemence on one side and meaningless grace on the other, the unintelligent imitator found himself helpless. It was time for a new leader. Rodin's remarkable nude, 'L'Age d'Arain,' was first seen in 1877, to be followed two years later by the still more unconventional 'John the Baptist,' a work so intense and so starkly human that it caused many a shudder and many a protest. It was the reaction that had to be. Elegance and carefully composed limbs gave way to as carefully planned crudities. The 'Balzac' and the 'Burghers of Calais' arose rude and impregnable where erstwhile had reigned the smiling graces. The 'Gates of Hell,' in which their author attempted to picture all the sins of humanity, were never to be completed, but from them poured forth a long series of works culminating in 'The Thinker.' The years moved on and the master's hand became impotent, his utterance faltering; yet stranger things, ranging from amorphous puerility to a realism akin to taxidermy, have been brought forth by his imitators. Among these, Boudelle and Maillot are apparently the most virile. A great spirit is Paul Albert Bartholomé, the painter turned sculptor, whose monument 'Aux Morts' rewards one's visit to the cemetery of Père Lachaise. Carved in broad, simple planes in the Paris limestone, it has been an object lesson to many young sculptors weary of realism or of factitious grace. Among these men of promise — and of fulfilment — are Henri Bouchard, Paul Landowski, François Sicard, Roger Bloche, Jean Boucher and others.

Many of the able sculptors of France leave but a single work of great value. Competition is fierce and opportunity comes but once. With Aubé it was his superb 'Dante' rather than the restless Gambetta monument. Lanson's 'Age de Fer,' Massoule's 'Un Ancêtre,' Escoula's 'Le Baton de la Vieillesse,' Dampt's 'Le Baiser de l'Aieule,' Longepied's 'L'Immortalité,' Gustave Michel's 'La Pensée' are among the works which come readily to mind. The animalists were never more numerous than to-day. Fremiet and Cain were followed by a host of whom Georges Gardet is best known. Even more numerous are the modernists led by Chaplain and Roty. Eclecticism guides modern French sculpture. Individualism is supreme. Temperament alone, whether displayed through romanticism or through naturalism, has guided expression. The result is the most varied art the world has yet seen. These French masters represent a living force and their achievements form a splendid contribution to the art of our time.

Spanish sculpture remained long out of touch with the modern world. To-day Barcelona and Seville boast a number of skilful men whose works have much in common with recent Italian productions. Augustin Quérol (1863–1909) was popular, but his monuments are extremely flamboyant. His statue of Francesco de Quevedo in Madrid is, however, admirable. Mariano Benlliure made interesting monuments to Martinez Campos and Sagasta, while some of his architectural decorations are very fine. Aniceto Marinas combines with much fluency a truly southern delight in detail, but is surpassed by Ricardo Bellwer who is prodigal in realistic accessories. Much freer from this fault is Miguel Blay, a pupil of Chapu, who has done much good realistic sculpture. An idealist of truly poetic inspiration is José Clara.

Modern Belgian sculpture begins with the names of Guillaume, Geefs, De Bay and Simonis, all of whom more or less ably fought against the influence of the then dominant



1 Two Human Beings by Linding
2 Pavilion of Flora by Carpeaux
3 Group at Capitol, Harrisburg, Pa., by Barnard
4 Group on Soldiers' and Sailors' Arch, Brooklyn, N. Y., by MacMonnies



1 Au but (At the Goal) by Boucher

2 Tiger devouring a Crocodile by Barye

SCULPTURE OF THE NINETEENTH CENTURY

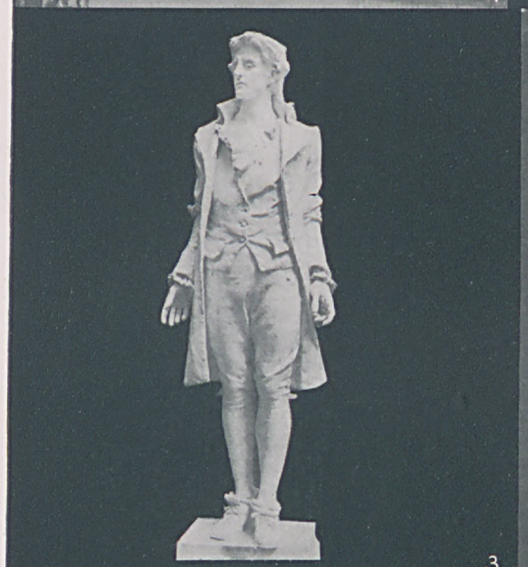


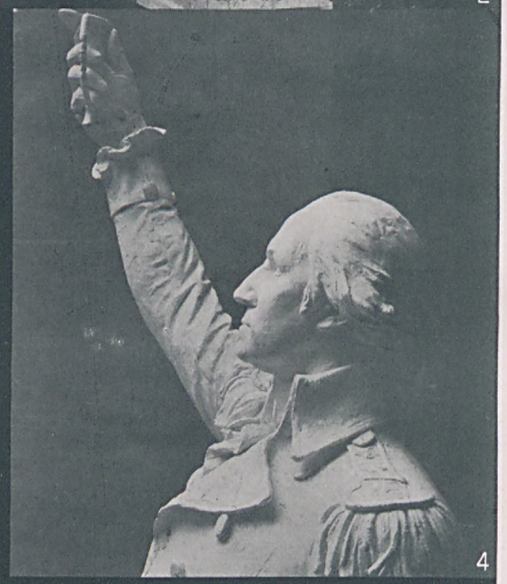
1 Joan of Arc at Domremy by Chapu
3 The Grandmother's Kiss by Dampt

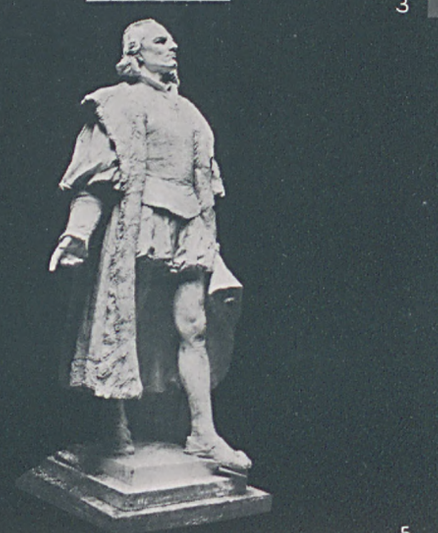
2 The Child by Bloch
4 The Thinker by Rodin













1 Lincoln by St. Gaudens
2 Standard Bearer by Bitter
3 Nathan Hale by MacMonnies
4 Washington by French
5 Columbus by Bartlett
6 Rochejaquelein by Falguiere

classic school. Paul de Vigne (1843–1901) was an idealist who produced many beautiful works. Charles van der Stappen (b. 1843) expressed himself largely in architectural sculpture. Thomas Vinçotte likewise did much to decorate the beautiful city of Brussels. Jef Lambeaux (1852–1918) was an artist of unusual vigor and originality; his latter works, however, became exaggerated and gross. His female figures seem to have been inspired by Rubens. Joseph Dillens has brought forth work of more uniform excellence. The austere yet sympathetic productions of Pierre Braecke point the way to Constantin Meunier (1831–1910), who is undoubtedly the great figure in recent Belgian sculpture. His art is that of Millet the painter, one of intense sympathy for the laboring man and an almost classic simplicity of rendering. His figures and reliefs of miners and iron workers; his statues of 'The Mower' and 'The Dockhand' are known everywhere and are truly sculptural conceptions grandly realized. J. Van Biesbroeck of Ghent, the Socialist sculptor, has also glorified labor in many impressive works, notably 'The People Mourn,' in the Luxembourg. Of the many clever men remaining but two can be named — two who represent the antipodes of ideals: Victor Rousseau, who in such graceful compositions as his 'Adolescents' and 'Sisters of Illusion,' exemplifies the traditional standards at their best, and George Minne, the poet and mystic, whose haggard art is at this time even more appealing.

The name of Bertel Thorwaldsen (1770–1844) looms large not only in the annals of Denmark, but in the history of modern sculpture. His art was Italian, though he believed it to be Greek. He brought to it the robustness of a strong-bodied, simple-minded peasant, and his life work contributed in no small degree to the great advance of sculpture. While he had little charm and little color sense, and personality is carefully obliterated from his ideal works, there remains nevertheless a simple, manly directness in his approach to every subject which wins our respect. What he created was always sculpture.

Thorwaldsen left no successor in his own land. The Norwegian Stefan Sinding (b. 1846) brought a new fame to Copenhagen, his adopted city. His 'Captive Mother' and 'A Man and a Woman' are elemental and truly great works. Per Hasselberg of Sweden (1850–94) was an artist of poetic gifts. His 'Snowdrop' and 'Frog Girl' are well known in America. Karl Milles and Carl Eldh are to-day prominent in Sweden.

The English have long patronized sculpture but have not until recently produced notable works. It was the French element which designed and decorated the noble cathedrals of England. John Flaxman (1755–1826) was one of the first Englishmen to win distinction in this essentially southern art, and his valuable contribution was largely in the form of designs for low reliefs. The many monuments by Sir Richard Westmacott (1775–1856) and by Francis Chantrey (1782–1841) resemble those executed by Flaxman. John Gibson (1791–1866) was a pupil of Canova and his work shows much of the grace and delicacy of his master. Alfred Stevens (1817–75) approached grandeur in his Wellington memorial in Saint Paul's. Thomas Woolner, Hugh Armstead, J. H. Foley and Edgar Boehm were prominent in their time and were succeeded by Thomas Brock (b. 1847), Hamo Thorneycroft (b. 1850), Onslow Ford (1852–1901) and Alfred Gilbert (b. 1854), men of much ability. Others notable to-day are Alfred Drury (b. 1857), Sir George Frampton (b. 1860), Bertram MacKennal (b. 1863) and Gilbert Bayes (b. 1871). A considerable number follow the example of Alfred Gilbert in uniting pure sculpture with an intricacy of detail such as wrought iron "entanglements" and combinations of enamels and richly chiseled metals, attaining in the side-lines of the art to very great dexterity. Several British painters have in the past turned with considerable success to the sister art; both Watts and Leighton did distinguished work, as did also, in animal subjects, Landseer and Swan.

German sculpture of the early 19th century offers but two or three names of importance, Gottfried Schadow of Berlin (1764–1850), a man of considerable talent, was somewhat eclipsed by Christian Rauch (1777–1857), a sculptor whose art was a perfect expression of his people and the time in which they lived. His monument to Frederick the Great in Berlin is an impressive work believed by many to mark the highest point reached by German sculpture. Rauch was assisted and succeeded by a number of pupils, among whom Friedrich Drake was perhaps the most gifted. Albert Wolf executed the 'Horseman attacked by a Lion,' of the Berlin Museum; its more famous companion group, the 'Amazon and Panther,' was made by Augustus Kiss (1802–65). An artist of exceptional refinement was Ernst Rietschel (1804–61) of Dresden, who glorified poets rather than warriors. Among his works are important monuments to Lessing, Goethe and Schiller at Weimar and to Martin Luther at Worms. Enke and Schaper, Hähnel of Dresden, and Bläser of Cologne likewise made contributions of value. Germany's love of the colossal began to reveal itself in such gigantic figures as Schwanthaler's 'Bavaria' in Munich, Schilling's 'Germania' in the Niederwald and Bandel's 'Hermann Arminius' in the Teutoburg Forest. Reinold Begas (1831–1911) was the favored sculptor of the new empire. His pompous and restless monument to William I in Berlin is an example of his "official" art; his 'Bismarck,' in the same city, is even less happy. Joseph Uphues has skill and better taste. A veteran of Munich is Adolf Hildebrand (b. 1847), highly esteemed even by the new and insurgent generation. His Wittelsbach fountain in Munich is especially notable. Another whose work is always dignified is Louis Tuaillon, famed for his two equestrian statues of the Emperor Frederick and a fine 'Amazon.'

Of a type quite different from any of these is the massive and archaic treatment to-day dominant in German sculpture. One of its most complete expressions is the enormous 'Bismarck,' which, like a grim sentinel, overlooks the city of Hamburg. It is the work of Hugo Lederer (b. 1871), an Austrian by birth, who has designed several of these impressive memorials in which the sculpture becomes an organic part of the architecture. The Kyffhanser memorial is another cyclopean effort with a figure of 'Barbarossa' by N. Geiger. No one

has practised the new and strange sculpture of Germany with greater virtuosity than Franz Metzner (b. 1870), another Austrian established in Berlin, whose works abound to-day in all northern Germany. The greatest of these will be found in the Leipzig Völkerschlacht memorial, which has been characterized as "the most complete embodiment of brute force — of the power to crush — that architecture has afforded since the pyramids."

Among the many younger men who followed the new-old archaistic movement are Hermann Haller, Hans Damman, Georg Kolbe, Arthur Lange; Bernhard Hoetger and Ludwig Habich of Darmstadt; Benno Elkan and Hermann Hahn of Munich. Theodor Georgii of the latter city is apparently content to do good sculpture without tinge of the momentary fad. A leader in animal sculpture is August Gaul (b. 1869). Certain German painters, notably Franz Stuck and Max Klinger, have attracted much attention through their experiments, especially in polychromatic sculpture.

Austria is prolific in sculpture, even supplying many leaders to Germany. The traditions of Vienna are of a florid art, as illustrated in the well-known frieze, 'The Triumph of Bacchus and Ariadne,' in the Court Theatre, the work of Rudolph von Wehr. Earlier, however, in the century come the names of Prof. Franz Bauer, the brothers Hans and Joseph Gasser, Anton Fernkorn, Johann Meixner and Kaspar von Zumbusch. Of the succeeding generation were Edmund Hellmer and Victor Tilgner and the ingenious Arthur Strasser. Among the many able men of to-day are Karl Stemolak and Karl Krikawa. Prague has its own abundant tradition; examples range from the stately Wenzel monument to the fascinating works of Jan Sturza. Nicholas Ligeti and Géza Maróthi are honored names in Budapest. Cracow likewise presents a varied record of recent tendencies, among which may be mentioned Winulski's monument to Jagello and Szymanowski's impressive 'Cortege of the Wawel.' One of the strangest products of the Viennese school is the young Dalmatian, Ivan Mestrovic, whose chosen work is the celebration of the prowess and suffering of his Serbian ancestry. His primitive art is weirdly impressive.

In Russian sculpture the name of greatest prominence is Marc Antokolsky (1845–1902). His powerful 'Ivan the Terrible' was followed by a series of dramatic works. Among his pupils was Ilia Ginsbourg. Lancéré is the best of many who have made small military and equestrian groups of great vigor. Leopold Bernstamm is better known in Paris than in Russia. Prince Paul Troubetskoy is famed for his impressionistic statuettes; but his method is less satisfactory in public monuments. Naoum Aronson (b. 1872) combines delicacy with forcefulness.

The artistic talent which exists everywhere in solution found but small encouragement during the first two centuries of American life; the slight achievements of Mrs. Patience Wright, modeler in wax; of William Rush of Philadelphia, carver of national figure heads, and of John Frazee in his portrait busts, are about all of which we have record. The history of American sculpture really begins with Horatio Greenough of Boston (1805–52), who in 1825 left Harvard College to study in Rome — the first of an endless procession who have sought inspiration and training abroad. Greenough's efforts naturally reflected the then dominant influence of Canova; his Zeus-like 'Washington,' intended for the rotunda of the National Capitol, was his most important work. Hiram Powers (1805–73) of Cincinnati, who followed in 1837, settled in Florence. His 'Greek Slave' had vast popularity at home and in England and is a landmark in American art history. Thomas Crawford (1813–57) crowded much enthusiastic work into a short life; his is the pediment of the Senate and the 'Freedom' upon the dome of the Capitol; also the Washington Monument at Richmond. It was Clark Mills, however (1815–83), who in 1853 created the first equestrian statue in America, the astonishing 'Andrew Jackson' of Washington, D. C. Other pioneers were Thomas Ball (1819–1911), who made the 'Lincoln Emancipating the Slave' in Washington and Boston, and the equestrian 'Washington' in the Boston Public Gardens; Henry Kirk Brown (1814–86), whose 'Washington' in Union square, New York, remains one of our finest equestrian statues; Randolph Rogers (1825–92), William Wetmore Story (1819–96) and Harriet Hosmer (1830–1908). Last, and perhaps most skilful of the American "classicists," was William H. Rinehart (1825–74) of Baltimore.

Erastus D. Palmer (1817–1904) of Albany and John Rogers (1829–1904) were of more distinctly native inspiration, the former creating works of no little ideal beauty, the latter celebrating patriotism and the homelier virtues in naïve, realistic statuettes. John Q. A. Ward (1830–1910) designed many virile monuments culminating in his noble statue of Henry Ward Beecher in Brooklyn. Other names of the early years are Launt Thompson (1833–94), Larkin J. Meade (1835–1910), Franklin Simmons (1839–1913), Martin Milmore (1844–83) and George Bissell (1839–), who have lived to see a marvelous development in American sculpture. Howard Roberts (1843–1900) of Philadelphia and Olin L. Warner (1844–96) were the first to seek training in Paris and thus turned the eyes of American students in a new direction.

It was Augustus Saint-Gaudens (1848–1907) who, after a thorough preparation in the École des Beaux-Arts, was called to the primacy among our sculptors. His 'Admiral Farragut' in Madison square, New York City (1881), set a new standard in American monumental art. It was followed by a series of distinguished works including the 'Lincoln' of Lincoln Park, Chicago; the Shaw memorial in Boston; the Adams memorial in Rock Creek Cemetery, Washington; 'The Puritan,' Springfield, Mass., and finally the equestrian 'Sherman' in New York City. These achievements, coupled with various ideal works and a host of remarkable portraits in low-relief, not only gave their author a commanding position among the foremost sculptors of the world but have greatly influenced the trend of American sculpture. No one has done so much to elevate the standard of craftsmanship in this country.

Daniel Chester French (b. 1850) has produced a great amount of admirable work. Best known is his well-beloved 'Death and the Sculptor.' This was followed by the colossal

'Republic' of the Columbian Exposition, the O'Reilly Memorial of Boston; 'Alma Mater' of Columbia University, the 'Continents' of the New York Custom House; the Melvin Memorial; the Alice Freeman Palmer Memorial; the Spencer Trask Memorial (Saratoga Springs, N. Y.), with its beautiful 'Spirit of Life'; the 'Lincoln' of Lincoln, Neb., and the same subject now under way for the great national Lincoln Memorial in Washington. Mr. French has also made a number of spirited equestrian statues — some of them in collaboration with Edward C. Potter (b. 1859), — as the 'Washington' in Paris and Chicago, 'General Grant' in Philadelphia and 'General Devens' in Boston. Saint-Gaudens' brilliant pupil, Frederick MacMonnies (b. 1863), lived in France for many years, modeling there his 'Stranahan,' 'Nathan Hale,' 'Shakespeare,' 'Bacchante,' 'Columbian Fountain,' 'Horsetamers,' groups for the Soldiers and Sailors' Memorial at Brooklyn and many other notable works. Equally well known abroad is Paul Bartlett (b. 1865), whose 'Columbus' and 'Michelangelo,' for the Congressional Library, are very distinguished conceptions. His equestrian 'Lafayette' stands in a court of the Louvre in Paris. More recent are the decorative figures for the Public Library of New York and the pediment of the House of Representatives in Washington.

George Grey Barnard has a personal expression of great originality and vigor, as demonstrated in his 'Two Natures,' 'The Great God Pan,' and two enormous groups for the State House of Pennsylvania. His 'Lincoln' for Cincinnati is particularly noteworthy and like Rodin's 'Balzac' has occasioned endless discussion. Another leader in American sculpture who like Saint-Gaudens was of Foreign birth, was Karl Bitter (1867–1915). His was the training of Vienna and his progress from the turgid decorations of the Columbian Administration Building of 1893 to the restraint of his Carl Schurz and Lowry memorials (respectively in New York and Minneapolis) and the fine pediment of the Wisconsin Capitol, offers an inspiring example. Herbert Adams (b. 1858) has contributed much to the high esteem in which American sculpture is held. His 'Bryant,' in New York, and other statues are well known, but even more famed are his exquisite portraits of women. Hermon A. MacNeil (b. 1866) has won a high position through his Indian subjects — particularly 'The Sun Vow' — and various memorials, of which the Albany Soldiers and Sailors' Monument is perhaps the most important. Charles Niehaus (b. 1855) is widely known for his 'Garfield' of Cincinnati, 'Hahnemann' in Washington and other important works. James E. Fraser, a younger man (b. 1876), scored a great success with his equestrian 'The End of the Trail' at the Panama-Pacific Exposition of 1915. Even better known are the various equestrian Indians by Cyrus E. Dallin (b. 1861), which by virtue of their simplicity and sincere workmanship are a real national asset. John J. Boyle, 1851–1917 did admirably sturdy work on native lines, as in 'The Alarm in Chicago' and 'The Stone Age,' Philadelphia.

Andrew O'Connor (b. 1874) won an early triumph with his bronze doors of Saint Bartholomew's Church in New York City, and has done much vivid sculpture, notably his impressionistic 'General Lawton' in Indianapolis, 'General Lew Wallace' in Washington and his recent 'Lincoln' for Springfield, Ill. Charles Grafly (b. 1862) of Philadelphia is recognized as the master of portraiture in the western continent; his busts of men are unsurpassed. A. Stirling Calder has a style all his own and did great service in the decoration of the Panama-Pacific Exposition.

Albert Jaegers (b. 1878) in his Von Steuben Monument in Washington; A. A. Weinman (b. 1870) in his Baltimore military memorial and his 'General Macomb' in Detroit have made valuable contributions to the monumental art of America, as have William Couper (b. 1853), Augustus Lukeman (b. 1872) and several others. Nor is any chronicle complete without mention of the Piccirilli family of New York, all skilful craftsmen and, in case of two at least, Attilio and Furio, admirable artists. John Donoghue (1853–1903) is remembered for one beautiful work, his 'Young Sophocles' in the Art Institute of Chicago, and Edmond A. Stewardson (1860–92) for 'The Bather.' Another whose death was untimely was Bela L. Pratt (1867–1917), of Boston. Among the many gifted men of a younger generation who are practising with success the ancient art are Robert Aitkin, Sherry Fry, Chester Beach and Albin Polasek, all but the first being graduates of the American Academy in Rome; as are Paul Manship, John Gregory and Leo Friedlander, who have been greatly influenced by the present archaistic tendencies of that institution.

Like Philadelphia, Baltimore has its little band of sculptors and Cincinnati and Saint Louis, each, at least one; Chicago has a large school and an exceptionally united group of craftsmen, while San Francisco shows numerous public works of Douglas Tilden and his pupils. Inspired by the traditions of Saint-Gaudens several American medalists have won distinction, among them Victor Brenner, John Flanagan, J. E. Fraser and A. A. Weinman. In the sculpture of animals Edward Kemeys (1843–1907) long stood alone, but to-day such skilful men as Edward C. Potter, A. Phimister Proctor, Solon H. Borglum and Edward Roth have won high places.

The women sculptors of America who have been honored by membership in the National Sculpture Society are Mrs. Gail Sherman Corbett, Misses A. St. L. Eberle, Harriet W. Frishmuth, Laura Gardin, Frances Grimes, Anna V. Hyatt, Evelyn B. Longman, Mrs. H. H. Kilson, Mrs. Carol B. MacNeil, Miss Janet Scudder, Mrs. Bessie Potter Vonnoh, Miss Nellie V. Walker and Miss Enid Yandell.

LORADO TAFT,
Author of 'The History of American Sculpture,'

SCULPTURE SOCIETY, National, a society founded 30 May 1893, and incorporated 1896. Up to the earlier of these dates sculpture had received somewhat grudgingly a place in the picture exhibitions and this fact led the sculptors to band together for a separate organization. In 1895 an exhibition for sculpture alone was held in New York, the objects shown having the advantage of a background of architecture, trees, shrubbery and flowers and pe-

riodical exhibits have since been held. One reason for the existence of the National Sculpture Society was to provide a centre of authority regarding public and private monuments, and its influence has been beneficially exerted on the decorations and the decorative sculptures of many important public buildings and festival undertakings. The headquarters of the society are at 212 West 57th street, New York City.

SCUP, one of the names of an important American food-fish (*Stenotomus chrysops*) belonging to the family *Sparidæ,* to which the sheepshead and snapper also belong. Besides some technical characters of the skeleton and swim-bladder the scup may be known among fishes inhabiting the same region by its deep compressed body, prominent dorsal spines, of which the third is elongated and the canine-like incisor teeth. The color is silvery gray with purplish reflections above, pure silvery on the sides below. This fish is abundant from Cape Cod to the Carolinas and reaches a large size on rocky ledges where food is abundant, though ordinarily not exceeding 9 or 10 inches in length; it reaches a remarkable size at the age of two years. In the South it is known popularly as porgy. Consult Goode, G. B., 'American Fishes,' (New York 1888); Jordan and Evermann, 'American Food and Game Fishes,' (New York 1902).

SCURVY, a disease resembling purpura, characterized by inanition, anemia, asthenia, ecchymoses and a tendency to swelling and bleeding of the gums. It is mainly due to disordered nutrition from improper food. Sometimes it follows a deficiency of fresh vegetables and fruits, or an excess of salt fish and pork, the use of tainted food, a too monotonous diet, or an insufficient amount of food. General ill health and malnutrition, and a cold, damp winter, compelling persons to house themselves, are predisposing causes. No condition of the blood differing from that found in other anemias has been recognized. Some believe that the disease is an infection because it has often spread rapidly in prisons, workhouses, etc., and sometimes has a distinct period of incubation, and because one attack, as a rule, confers immunity. It is not related to relapsing fever, which is contagious.

Up to the middle of the last century scurvy was frequent during wars, pestilences and famine, and especially on long sea-voyages when the diet consisted largely of bread, tea and salt meat. During the Crimean War 23,000 cases of scurvy occurred among the French troops alone, and in the American Civil War 15 per cent of the deaths were from this disease, though many cases recovered, owing to the use of vegetable food furnished by the Sanitary Commission. At the present time scurvy is comparatively rare, as most vessels going on long voyages are supplied with a variety of anti-scorbutics, canned meats, lime-juice, lemons, and other fruits, vegetables, etc., and on land, in civilized countries, or at least where hygiene is not rudimentary, fresh fruits and vegetables are more used than formerly.

In scurvy the blood coagulates poorly, its red corpuscles are diminished, while the white are increased in number. Sometimes there is œdema of the feet and ankles and serous exudation into the pleural and large joint cavities. There are purpuric spots in the skin, especially on the legs, ecchymoses in the pleura, pericardium, cerebro-spinal meninges, synovial membranes and in the mucous lining of the bronchi and alimentary canal; and hæmatoma in muscles like the gastrocnemius and glutæus, which may suppurate or in part organize. The gums are swollen, especially about the teeth, and their deeper layers are thickened; fatty changes occur in the liver, spleen, kidneys and heart; the bones may be carious or fractured; and the bone-marrow and mesenteric glands may display hemorrhagic infiltration. In infants the ecchymoses are almost entirely subperiosteal, the blood raising the periosteum (usually of femur, sometimes of tibia or fibula, rarely of the bones of forearms or other parts) in a fusiform swelling, surrounding the bone. The bones become thickened and sometimes superficially necrosed. The epiphyses may separate. The gums may be spongy.

The symptoms of scurvy, which usually develop slowly, include lassitude, anemia, flaccidity of muscles, a cool, dry skin, with sometimes a yellowish pallor. When the disease is developed the gums are red, nodular or fungous, and bleed readily. When the disease is advanced, hemorrhage occurs internally or externally, the breath is offensive, the gums ulcerate, and the teeth loosen. There is thirst, with a craving for sour food and condiments; the joints are swollen and painful; syncope, dyspnœa, and pulmonary congestion are common; the urine is scanty, high-colored, and less than normally acid; the temperature is subnormal (96° F. or 97° F.). The patient is pale, feeble, much emaciated, mentally depressed, and may have low delirium and coma. Meningeal hemorrhage may cause convulsions or hemiplegia. In infants, over the inflamed periosteum there is intense pain and tenderness, swelling and a tense, shiny skin. The child screams when moved, loses appetite, emaciates, grows pale and feeble, perspires freely. There is usually diarrhœa, sometimes hematuria, hemorrhagic blebs in the pharynx, and extravasation of blood in the orbit. Other extravasations, however, are rare. The present day attitude is to regard scurvy as a disease duct, the deficiency of certain ingredients in the diet. These are usually chemical or nitrogenous phosphorus compounds, often called vitamines.

SCUTAGE, or ESCUAGE, in the feudal system the fee on payment of which the military service due from the holder of a knight's fee was not exacted. It originated about the 11th century, and the irritation caused by its exaction was one of the causes that moved the barons to oppose King John in 1214. Consult Baldwin, J. F., 'The Scutage and Knight Service in England' (Chicago 1897).

SCUTARI, Anatolia, city on the east shore of the Bosporus, opposite Constantinople. It is a busy trading centre of ancient date, and now an important railway junction, with manufactures of silk and cotton textiles, leather, etc. Historic Chalcedon as the modern village of Kadiköi is two miles distant to the south. Scutari was prominent during the Crimean War 1854–56, as the scene of the ministrations of Florence Nightingale and her co-workers, and was also the centre of great activity during the European War. Pop. about 100,000.

SCUTARI, skoo'ta-rē, Albania, (1) capital of the province of Scutari, at the confluence of the Drin and Boyana, lies near the Lake of Scutari. The town is fortified, the citadel crowning an eminence. There are besides, two castles, mosques, Greek and Catholic churches, shipbuilding yards and factories for cotton and firearms. There is an active trade. The exports include wool, wax, hides, skins, tobacco and dried fish, sent to Trieste, Venice and Avona. The imports are colonial produce, silk and other manufactured goods which are sold at the large fairs. The fisheries are important. Pop. 32,000.

(2) The province or sanjak of Scutari contains 4,516 square miles and has a population of 322,000.

(3) The Lake of Scutari is 18 miles long by 6 miles wide; on the northwest it receives the Moratcha. The Boyana forms its outlet into the Gulf of Drino in the Adriatic Sea.

SCYLLA, sil'a, a character in mythology, the daughter of Nisus, king of Megara, who, when Minos came from Crete to attack Megara, in revenge for the death of his son, Androgeos, was led by her love for Minos to cut off from the head of her father, King Nisus, a purple lock of hair which while it remained on the head of Nisus made it impossible for Minos to take the city. Megara was captured and Nisus slain, and Scylla was either drowned or changed into a fish which Nisus, changed into an eagle, constantly pursued.

Also another Scylla, mentioned in the Odyssey, as a monster with 12 feet, six necks and six mouths, and occupying a rock on the Italian coast. Legends represent her as having been a beautiful woman changed into a monster through the jealousy of Circe or Amphitrite.

SCYLLA and CHARYBDIS, ka-rib'dis, the former a promontory of southern Italy, at the entrance of the strait which divides Italy from Sicily. Navigation around this promontory was considered dangerous by the ancients, but is regarded by moderns as not attended by special difficulty. Charybdis is a whirlpool nearly opposite the entrance to the harbor of Messina in Sicily, the navigation of which is regarded as very dangerous even to vessels of the present age and which must have been extremely perilous in ancient times. "Between Scylla and Charybdis," means to be confined to a choice between two dangerous situations.

According to the Odyssey (xii, 73ff.) these were two sea monsters, personifying the dangers of rocks and eddies. A description of Scylla is given under that heading. Charybdis sat opposite her, on a low rock under a fig tree, sucking in and belching forth, thrice daily, the adjacent water. In the 'Alexandreis' of Gautier de Lille occurs the famous line, "Incidis in Scyllam cupiens vitare Charybdim."

SCYTHIANS, the writers of the Classic Age confounded under this name several peoples, who dwelt from the present Rumania to the Pamir across middle Russia and the Caspian steppes. However, the authors who have best described these peoples distinguish the Scythians proper or *Scolotes,* as they called themselves, the immediate neighbors on the north of the ancient Greeks, from the Sarmates who lived to the east of these, and from the Saks who dwelt further east in the land now known as Turkestan.

The Scythians proper occupied from the time of Herodotus the region between Atlas (the present Aluta, tributary of the Danube) on the west and the Tanaïs (the Don or perhaps the Molotchnaïa) flowing into the Sea of Azov on the east. To the south their frontier was marked by the lower course of the Danube from the mouth of the Aluta, and by the Black Sea. To the north their territory extended to the country of the Agathyrces (Transylvania?), to the Neuri in the upper basin of the Dneister and the Bug, and to the Androphages. Altogether they occupy the eastern part of Wallachia, almost all Moldavia, Bessarabia, the present Russian provinces of Kherson and southern Podolia, and the Crimea, except the mountainous southern portion of the latter, which remained in possession of the savage Tauri. Herodotus divides the Scythians into (1) cultivators, dwelling in the valleys of the Dneister and the Bug, adjoining the Neuri and in the lower valley of the Dneiper and the Panticapée (probably the present Ingouletz); (2) the nomads of the eastern Crimea and south of the mouth of the Dneiper; (3) the Royal Scythians in the eastern Crimea and between the Dneiper and the Tanaïs; (4) the Kallipydes between the Bug and the mouths of the Danube. The Scythians are mentioned for the first time in Hesiod, and many ethnologists are of opinion that their arrival in Europe was about the 15th century B.C. The principal trait of nomadic life — sustenance from ass's milk — is recorded in every ancient description of this people, who were for the most part, nomads and warriors. Hippocrates gives a detailed description of their mode of life — in four-wheeled chariots, impervious to rain, wind and snow, and often divided into two or three compartments. These chariots were drawn by hornless cattle, the women and children remaining within them while the men accompanied them on horseback. They remained in the same place while there was forage sufficient for their animals, failing which they moved onward. They lived on cooked meats, ass's milk and cheese.

Excellent horsemen, the Scythians hunted and fought on horseback; they were famed as bowmen, but were poor swordsmen. Enemies slain in battle were scalped and their blood drunk from the skulls of others previously slain.

Their religion was a kind of polytheism without external worship. They had no temples nor images of deities to which prayers and sacrifices were offered. The god of war alone had special places reserved for his especial adoration. To him animals and even human beings were offered in sacrifice. Fire worship was general. Women enjoyed a certain amount of consideration due, it is thought, to the legend that the people were descended from a female-warrior race, the Amazons.

The mode of life of the nomadic Scythians led many to a belief in their Mongolian origin. This opinion is, however, no longer held. The little we know of their language, customs and religion leads rather to the conclusion that they were Iraneans. About the second century B.C. the Scythians were conquered by the Sarmates and absorbed by them. Thereafter they dis-

appear from history. Consult Deniker, 'Races of Man'; Ratzel, 'History of Mankind' (3 vols., London 1900).

SEA. See Oceans.

SEA-ACORN, or **ACORN-BARNACLE,** a barnacle of the family *Balanidæ*. See Barnacle.

SEA-ANEMONE, a popular name, having reference to their flower-like aspect, for certain polyps or cœlenterate animals belonging to the suborder *Actinaria* of the order or class *Anthozoa*. The sea-anemones are sac-like animals of a more or less cylindrical form, usually fixed by a base or foot to some firm body, and with a disc at the opposite end in which is the slit-like mouth surrounded by whorls of simple hollow tentacles in greater or less number, but nearly always some multiple of six. From the mouth a short tubular gullet or œsophagus reaches into the cavity of the body to the walls of which it is connected by radiating septa or mesenteries, which divide the body-cavity into a corresponding number of sacs, with all of which the œsophagus communicates by a central space into which the septa do not reach. A pair of ciliated grooves or siphonoglyphs extend along opposite sides of the œsophagus and into the corresponding corners of the mouth. These always remain open and are the seat of inflowing and outflowing currents of water, serving a respiratory function as well as for the transportation of waste matter from the body. The body-walls, as well as the tentacles, which are outgrowths from them, are very contractile and largely composed of muscles arranged in a circular and a longitudinal layer, the former serving for purposes of extension, the latter for retraction. These muscles have special relations to the mesenteries. The mesenteries are vertical radiating septa reaching from the mouth disc or peristome to the base, and from the body wall to the œsophagus, but below the level of the latter ending freely. They are not strictly radial in arrangement but are grouped in pairs almost always, like the tentacles, in some multiple of six. The mesenteries corresponding to the siphonoglyphs differ in structure from all of the others and are termed directive; the others form different classes according to the order and degree of development. The inter-mesenteric sacs may further communicate by one or two pores in each mesentery. Along the edges of the septa the testes and ovaries are developed from the cells lining the gastric cavity. Digestive cells are also found in the same region as well as an area filled with stinging thread cells or nematocysts. In some species the latter are found in addition upon delicate threads or acontia which may be protruded through the mouth or cinclides.

Most of the anemones live singly, but some are colonial, in which case they never, like the closely related stone corals, form an internal limy skeleton, but may form a superficial one in the ectoderm. Generally they live attached to rocks or piles, but a few burrow in mud or sand, some as commensals fix themselves to shells inhabited by hermit crabs, etc., and a few are truly parasitic in jellyfishes. All are marine; most sublittoral, some deep-sea and a very few pelagic. They reproduce both asexually by budding and fission and sexually by eggs and spermatozoa, which are usually produced by different individuals. The eggs are fertilized in the gastric cavity and escape from the mouth in most cases as minute free-swimming larvæ or planulæ which soon attach themselves, develop mouth, tentacles and mesenteries, the latter in a definite order, until the adult structure is attained. Sea-anemones are carnivorous, but, having very limited powers of locomotion, are dependent upon such food as falls upon the expanded tentacles and peristome. This is captured through the paralyzing effect of the stinging cells or engulfed by the enfolding tentacles and passed through the mouth into the gastric cavity for digestion, the undigested portion being rejected through the mouth. They will devour a surprising quantity of food and grow rapidly; and if starved, gradually shrink to almost the point of disappearance without losing their form. The species are quite numerous and are chiefly distinguished by the arrangement of the septa and tentacles, with color, form, etc., as minor characteristics. Most of them and particularly the tropical forms are beautifully colored. A large, handsome and variable species very common on the rocky shores of New England is *Metridium marginatum,* which makes an interesting inmate of the marine aquarium. Consult Agassiz, E. C., and A., 'Seaside Studies in Natural History' (Boston 1871); Arnold, A. F., 'The Sea Beach at Ebb Tide' (New York 1900); Mayer, A. G., 'Sea-Shore Life' (ib. 1905); Lankester, 'Treatise on Zoology,' Pt. II (London 1901); for American species, Parker, 'American Naturalist' (1900).

SEA-BASS, a fish (*Centropristis striatus*) of the family *Serranidæ* (q.v.), also known as the black-fish, etc. It commonly attains the length of about a foot and a weight of two to four pounds, and is readily known by the large mouth with the teeth of moderate and nearly uniform size, the smooth area on top of the head, the rather large very rough stenoid scales, continuous dorsal fin with a very strong spine and the slightly trilobate tail with a short filamentous tip to the upper angle. The color is mottled blackish with more or less evident parallel pale streaks. The sea-bass is well known along the entire Atlantic Coast of the United States and is very common from Cape Cod to the mouth of Chesapeake Bay. It lives on rocky ledges wherever an abundance of food offers itself, and feeds voraciously upon all sorts of small crustaceans, fishes, squids and other mollusks, etc. The sea-bass is a sluggish bottom-loving fish, but appears to be somewhat migratory. It spawns in June and the eggs are of small size and buoyant. During the summer large numbers of the young collect in the shallow bays, where eel-grass grows in abundance. Owing to its abundance and the readiness and determination with which it takes the hook this is deservedly a favorite with anglers who lack the opportunity or skill to cope with nobler game. The fishing is done with hand-lines in from 5 to 20 fathoms of water, a heavy lead and a stout hook, preferably baited with squid, being required. Where they are plentiful two fish are frequently brought up simultaneously on as many hooks and large strings are taken during a single slack water, which is the time best suited to their capture. For the market large numbers of sea-bass are taken by lines and in pound nets on the coasts of New Jersey and Massachusetts. The firmness, whiteness and sweetness of its flesh makes this a table favorite, especially for chowder. The sea-bass is readily propagated artificially, but there has been no necessity for entering upon this work on a large scale. The name is also sometimes applied to various other more or less closely related species.

SEA-BEANS, very hard-shelled seeds of tropical plants carried by ocean currents and deposited on beaches, where they take root. Those washed up on the Florida sands take a high polish and are made into jewelry and souvenirs. The polished, marble-like, pale-gray seeds are those of a tall Central American shrub (*Cæsalpinia bonducella*), known in their native country as the nicker or bondue nuts. They are employed for necklaces and by Indian doctors as a tonic and vermifuge. Other common sea-beans are flattened, like lima beans, with a pitted or granular surface, and are of various sizes and hues, ranging through shades of red and brown to black or mottled. These are the fruits of species of *Mucuna* and *Stizolobium,* the former climbing shrubs, the latter annual herbs, widely dispersed through the tropics and very annoying to travelers, as the seed-pods are covered with stinging hairs, easily detached. The Queensland nut, the Kindal-Kindal of Australia, is a nutritious nut, the fruit of a small Australian tree (*Macadamia ternifolia*) and so valuable as a food that no one is allowed to fell the trees. The seed is about the size of a hazelnut, with somewhat the same flavor. It is squarish, jet black, with a polished surface of iron-like hardness. A woody climber (*Entada scandeus*), native to Australia, the West Indies and other tropical countries bears pods two to four feet long and several inches wide. Its seeds, known as liner-beans, from their color, are used for washing the hair and for laundering and the shells are made into receptacles for trinkets.

SEA-BEAR. See Seal.

SEA-BLITE. See Goosefoot.

SEA BOUNDARIES. See Boundaries of the United States.

SEA-BREAMS, fishes of the marine family *Sparidæ,* represented in the United States by the sheepshead and its congeners. They are coast-fishes of modern size, distributed throughout the warm and temperate parts of the world and are usually of dark coloration. They are distinguished by the strength and elaboration of their teeth, fitting them for seizing and chewing crustaceans, mussels and shellfish of all sorts. The fish most famous under this name is probably that of the Mediterranean *Chrysophrys aurata,* called gilthead in England, which sometimes reaches a weight of 20 pounds, and was one of the kinds fattened by the Romans of the classic age in fish ponds and regarded as especial delicacies.

SEA BUCKTHORN, or **SALLOW-THORN,** a monotypic genus (*Hippophaë*) of the *Elæagnaceæ,* confined to temperate Europe and the steppes of central Asia, and living near sea-coasts and alpine rivers. The single species, *H. rhamnoides,* is a thorny shrub, sometimes cultivated, especially for hedges near the sea in sandy soil, where it grows luxuriantly. The leaves are linear lanceolate, silvery in color; the inconspicuous diœcious flowers on the female plants are followed by succulent orange-colored, agreeably acid fruits. When the fruit is ripe in the fall the female plants are very beautiful because the berries are very abundant. These are used for making fish-sauces, jellies and condiments.

SEA-COCOANUT. See Palms.

SEA-COOT, a gunners' name for certain dark-colored ducks, especially the American scoter.

SEA-COW, a name often applied generally to sirenians (see Sirenia; Manatee), but especially restricted to the species formerly inhabiting the Pacific Coast of Kamchatka,—Steller's sea-cow (*Rhytina stelleri*), now extinct. Structurally it differs from other sirenians in the total absence of teeth, the masticating surfaces of the jaws being merely horny pads, very dense and hard. The tail was lobed and the fore limbs small truncate paddles. This was a very large animal, attaining a length of 25 feet and being very bulky. It is now entirely extinct and was under the observation of white men for a bare quarter of a century. In 1741 the explorer Bering and the naturalist Steller discovered this great animal about the shores of two small islands, now known as Bering and Copper islands, in the extreme north Pacific Ocean. It is not known to have lived elsewhere and there is no proof that any examples have been seen since that killed in 1768. Steller has preserved an account of their habits and anatomy during the period when he was a shipwrecked resident of that inhospitable region. The animals were at that time very abundant in the shallow waters about the islands, where they fed upon the large seaweeds which grow there so plentifully. They were extremely sluggish and inactive and of an unsuspicious, affectionate disposition. Upon Steller's return to Germany his discovery and suggestion that the flesh of these great seacows be utilized by explorers were published. Russian traders and trappers visited the islands in large numbers and in the short space of time noted exterminated this interesting animal. Consult Nordenskiöld, N. A. E., 'Voyage of the Vega' (English trans. by Alexander Leslie, 2 vols., New York 1881), and Stejneger, L. H., in the *American Naturalist* (Vol. XXI, Salem, Mass., 1887).

SEA-CUCUMBER, a holothuria (q.v.).

SEA-DEVIL, a devil-fish (q.v.).

SEA-DOVE, the little auk. See Dovekie.

SEA-EAGLE, an eagle of the genus *Haliaëtus,* especially the white-tailed eagle or Erne (*H. albicilla*) of Europe. See Eagle.

SEA-EGG. See Egg-urchin; Sea-urchin.

SEA-ELEPHANT. See Elephant-seal.

SEA-FAN. See Gorgonia.

SEA-FIR, a sertularian. See Cœlenterata.

SEA-FOX, a shark. See Thresher.

SEA-GULL, The (Chalka), a tragedy of Chekhof, first performed in Saint Petersburg in 1896, when the author was 31. It failed, but later met with brilliant success at the Moscow Theatre, and has perhaps been the most popu-

lar of Russian plays on the English stage. It was translated into English by Marian Fell (Mrs. Van Agnew) and published in New York in 1912. A hint at the plot may be given by a sort of algebraic formula: A, a famous actress, is the mistress of B, a famous novelist, who comes with A to visit her brother C, a typical landowner and invalid. A's son, D, who has ambitions as a playwright is in love with E, the beautiful daughter of a wealthy landowner. E, being unhappy at home, has a great desire to go on the stage, and easily falls a victim to B, who seduces her and deserts her, after their child is born. E comes back secretly after two years and has a passionate interview with D, confessing that she still loves B. She disappears, and D shoots himself. On C's estate is a beautiful lake which is the haunt of gulls. D kills one of them and has it stuffed. This "chalka" is typical of the heroine, E. B to E once said: "A young girl grows up on the shores of a lake, as you have. She loves the lake as the gulls do, and is as happy and free as they. But a man sees her who chances to come that way, and he destroys her out of idleness, as this gull here has been destroyed."

There are passages of wit and humor in the play, but it is chiefly notable for its revelation of the darker strains of human nature, depicted with relentless realism and yet with a passionate sympathy with all suffering, physical, mental and moral. It is also interesting here and there, especially in contrasting the literary methods and aspirations of B and D, giving a hint at Chekhof's own literary creed. And E, the lovely young heroine, shows her whole attitude, in advance of the tragedy which, while it ruins D, only gives the cachet to her own ability as an actress, when she exclaims to her seducer: "For the joy of being an author or an actress I could endure want and disillusionment and the hatred of my friends and the pangs of my own dissatisfaction with myself; but in return I should demand fame — genuine, resounding fame."

NATHAN HASKELL DOLE.

SEA-HARES, a genus (*Aplysia*), of opistho-branchiate gastropod mollusks, in which the shell is either absent or very rudimentary, and is concealed by the mantle. These animals are slug-like in appearance and derive their popular name from the prominent character of the front pair of tentacles which somewhat resemble the ears of a hare. The side lobes of the mantle are used as fins, and are reflected over the sides and back of the sea-hares, these portions of the mantle thus concealing the shell. This latter structure, when developed, is of oblong, flexible and transparent character. The gills are placed in the centre, and at the posterior portion of the dorsal surface or back; and four tentacles exist. Eyes are present, and are situated at the base of the hinder tentacles.

The sea-hares are widely distributed throughout most seas, and generally inhabit muddy or sandy tracts. The eggs are deposited in long strings. The food consists chiefly of sea-weeds, but they also devour small crustaceans, mollusks and annelids. The mouth possesses thick muscular lips, and the stomach is of compound nature, consisting of a crop, muscular gizzard and accessory cavities. The sea-hares were notorious among the ancients for their supposed venomous properties, and formed ingredients in the poisonous compounds used of old to destroy enemies. Locusta is thus said to have used them against the enemies of Nero; and they formed ingredients in the draught prepared for the tyrant himself. Domitian was similarly suspected of administering the poisonous Aplysiadæ to his brother, Titus. And when Apuleius was accused of practising magic a chief proof against him was the fact that he had employed fishermen to obtain sea-hares for him. These animals, however, are harmless so far as poisonous properties are concerned, except that some species exude an acrid liquor irritating to the human skin. The "lernæa" (*Aplysia leporina*) of the Bay of Naples has an evil reputation among fishermen for causing pain and sickness when touched. The sea-hares also emit a fluid of a rich purple hue, which, like the ink of the cuttle-fishes, has the property of diffusing itself quickly throughout the surrounding water. Gosse mentions that a West Indian species of Aplysia, on being put into a basin of clear sea-water, emitted sufficient of this purple secretion to tinge deeply the whole of the water within a few minutes. Consult 'Cambridge Natural History' (Vol. III, New York 1895); Lankester, 'Treatise on Zoology' (Vol. V, London 1906); Parker and Haswell, 'Text-book of Zoology' (Vol. I, New York 1910).

SEA-HORSE, a small fish of the genus *Hippocampus,* in which the head bears a close resemblance to that of the knight in chess. They belong to the order *Lophobranchii* and the same family (*Syngnathidæ*) as the pipe-fishes. From the latter, and indeed from all other fishes, they differ in having a prehensile tail, which is long, tapering and quadrate in section, owing to the integument of angulated, bony plates, and lacks altogether the caudal fin. The body is compressed, curiously prominent below, protected by rings of spinous bony plates, and bears small pectoral, dorsal and anal fins. In addition to its form the head is remarkable in being supported at right angles to the body-axis on a neck-like construction. Like other parts it is protected by tuberculated or spiny bony plates. A prolonged snout bears the small toothless mouth at its end. The gills are tufted and their arches and covers poorly developed. About half a dozen closely similar species are found in our waters, the best known of which is *H. hudsonicus* found in shallow bays and estuaries along the Atlantic Coast as far north as Cape Cod. There is no more interesting inmate of the marine aquarium than the sea-horse, which twists its tail about the stems of sea-plants, among which it seeks concealment or swims slowly in a very unfishlike attitude, with coiled tail, upright in the water. As in the pipe-fishes the eggs are protected until hatched in a brood-pouch at the base of the tail of the male. Other species occur in the warm waters of the Gulf of Mexico and California. A remarkable related genus is *Phylloperyx* of Australian seas, which bears numerous long cutaneous streamers closely mimicking the seaweeds among which the animal dwells.

In symbolic and heraldic art a "sea-horse" appears as a fabulous marine animal with fore-parts like those of a horse, and with hinder parts like a fish. Neptune is depicted as using them to draw his chariot. In the sea-horse of heraldry a scalloped fin runs down the back. In Biblical literature and early books generally the term often refers uncertainly to the walrus or to the hippopotamus. Consult Gunther, Albert, 'Introduction to the Study of Fishes' (London 1880), and Jordan, D. S., 'Fishes' (New York 1907).

SEA ISLAND COTTON. See COTTON IN THE UNITED STATES.

SEA ISLANDS, the islands off the coast of South Carolina, south of Winyah Bay. They are a chain of low, flat islands noted for their fertility. The principal islands are Hilton Head, Port Royal, Saint Helena, Edisto, Johns and James. The quality of the long fibred "Sea Island cotton" is famous, and the rice product is large. In 1893 and in 1894 hurricanes devastated several of the islands, inundating them with the tidal waves and destroying the crops.

SEA-KALE, a cruciferous, large-leaved perennial (*Crambe maritima*) indigenous to the coasts of Europe. It has glaucous cabbage-like foliage and clusters of showy white flowers and is cultivated in rich soil for the young shoots and unfolded leaves, which are blanched and eaten as spring vegetables, like asparagus.

SEA-LAMPREY. See LAMPREY.

SEA LAVENDER, SEA PINK, THRIFT, a name common to various species of *Statice* (q.v.), and to the closely allied species of *Limonium.* Several of the former, being hardy, are popularly cultivated as border plants. They include annuals, biennials and perennials with abundant small blue, lilac, yellow or white flowers which are often used for "everlasting" bouquets. Species of *Limonium* are mostly perennial, are useful for cut flowers and for planting among rocks.

SEA-LEMON, a shell-less mollusk of the nudibranch family *Doridæ,* of cosmopolitan range. The body somewhat resembles a lemon in color, showing a beautiful plume-like tuft of gills (when expanded) on the back. These mollusks are carnivorous, feeding on zoophytes, crustacea, etc., and live under stones on the beach, usually near low-water mark. The eggs are emitted embedded in broad gelatinous ribbon-like masses, which may be found attached to the fronds of sea-weeds. These "spawn-coils," as they are named, include immense numbers of eggs. Darwin estimated that upward of 600,000 ova were contained in a coil found at the Falkland Islands.

SEA-LETTUCE, the delicate, thin, waving fronds of *Ulva lactuca,* a pale green sea-weed often used for food.

SEA-LILY, a crinoid (q.v.), especially a living example, as *Pentacrinus;* fossil crinoids are often called stone-lilies.

SEA-LION. See SEALS.

SEA-MAT, or **HORN-WRACK,** a colony of polyzoans (see POLYZOA); specifically, on British shores. Some species of *Flustra,* as the broad horn-wrath (*F. foliacea*).

SEA-MINK, one of the names of the king-fish (*Menticrrhus americanus*). See KING-FISH.

SEA-MOUSE, a free-moving marine annelid of the genus *Aphroditæ,* the most highly organized of "the world of worms." The body is oval, the head is provided with tentacles and two eyes and the back is covered with scales, which, by their expansion and contraction, provide for the admission and expulsion of water from the gills or branchiæ, situated beneath them. The most notable feature of these animals, however, is the beautiful iridescent hues exhibited by the hairs, which, as in other *Errantia,* fringe the sides of the body. The setæ of *Aphroditæ,* even preserved in spirits of wine, still give up these brilliant hues. These animals inhabit deep water and may be obtained by dredging, although they are frequently cast up on shores after storms. Various genera and species exist, some of which are North American. Consult Verill, 'Zoology of Vineyard Sound' (1875).

SEA-ONION, a squills. See SCILLA.

SEA-OTTER, a fur-bearing animal (*Enhydris* or *Latax lutris*) of the weasel family (*Mustelidæ*), and in its webbed hind feet and aquatic habits resembling the true otter, with which it is united zoologically in the subfamily *Lutrinæ.* The sea-otter is of a robust build, about four feet long, with a short blunt tail, short limbs, small fore feet and large, fully-webbed hind feet. The ears are small and the broad muzzle bears spreading tufts of stout bristles. There are but two incisor teeth on each side of the lower jaw and the molar and premolar teeth are remarkable for their massiveness and the bluntness of the cusps. The inner fur, which is very soft, dense and woolly, is deep brown or, in old animals, black, the longer white-tipped hairs being scanty on the body, to which they impart a hoary aspect, but more abundant on the yellowish or grayish head and neck. Sea-otters were formerly very abundant on rocky shores and islands of the north Pacific on both the American and Asiatic sides. The natives of the Aleutian Islands clothed themselves in their skins, but with the increased demand for the fur in China, Europe and America, and especially among the Russian nobility, their unremitting pursuit by native and white hunters has rendered them one of the rarest and most valued of fur-bearing animals. In greatly reduced numbers they are still found in Alaska and within the United States on a very limited reach of the Oregon coast. The otters are now found especially on the island-like masses of the giant bladder kelp or sea-weed and much persecution has made them exceedingly shy and wary. They are strictly marine and never leave the vicinity of water. Their food consists of various kinds of crustacea, mollusks and sea-urchins, which are easily crushed between the blunt massive teeth which are not at all adapted to a fish diet. A single young is born at a time and at any season, and is nursed by the mother as she lies on her back in the water. A century ago a single trading company secured as many as 15,000 skins, valued at $1,000,000, in one year, but now the annual production of all the hunters would not exceed 5,000, and single skins are worth $150 to the hunter and $1,000 or more at the final market. Formerly they were taken in nets, or shot, speared and clubbed; but now are usually shot with rifles either by the natives from boats or while patroling the beach, or from observation tripods erected by white hunters

on the shores. The Alaskan fishery is now regulated by law. Consult Elliot, H. W., 'Report on Alaska' (Washington 1875); Coues, E., 'Fur-bearing Animals' (Washington 1877); Taylor, W. P., 'Osteology and Evolution of the Sea-Otter' (in 'University of California Publications,' Vol. VII, No. 25, Berkeley 1914).

SEA-PEN, an alcyonarian coral of the family *Pennatulidæ* (class *Actinozoa*). It is a compound organism, which consists of a main stem with lateral pinnæ or branches, forming a feather-shaped community. The lower end of the stem is fleshy, destitute of polyps and contains an internal coral-rod, by which the sea-pens attach themselves loosely to the mud of the sea-bed. In color they are reddish-purple, the lower extremity being of a bright orange hue. The branches are studded on their upper margins with the individual polyp, which are connected together through the fleshy medium or cœnosarc. These organisms are common in all the warm seas. The Arctic species, *Umbellularia grœnlandica,* attains sometimes the extreme length of four feet.

SEA-RAVEN, a large and very spiny and irregular sculpin (*Hemitripterus americanus*), common about rocky shores and reefs from the Arctic coasts to Cape Cod. See SCULPIN; SEA-ROBIN.

SEA-ROBIN, a popular name for certain of the gurnards (*Triglidæ*) in allusion to their generally reddish color and large wing-like pectoral fins. They have rather large heads, encased in bony plates and with flattened snouts and elongated tapering bodies covered with small scales. The pectoral fins are very large and spreading and are especially remarkable in having the three lowermost rays separated from the fin-web and free from one another; they are somewhat enlarged, provided at the end with special organs of touch and are used much like so many fingers to feel the bottom, turn over stones and other small objects and to detect the presence of food. Numerous species of the genus *Prionotus* inhabit American seas, especially southward, the best known of which are the short-winged sea-robin (*P. carolinensis*), with the pectoral fins red and less than half as long as the body and the long-winged sea-robin (*P. strigatus*) with the pectorals brown and more than half as long as the body. Both are common as far north as Cape Cod and the former in Massachusetts Bay also. The sea-robins are extremely interesting to watch, as they turn over small objects on the bottom with their tactile rays in search of the small fishes and crustaceans upon which they feed. Large numbers are caught upon lines and in nets, but though the flesh is white and very excellent, they are not considered to be a food-fish. Several related species are found on the Pacific Coast, and elsewhere, and some are called flying-fish. See SCULPIN.

SEA-SERPENT, a more or less mythical sea-monster of serpentine form and reputed gigantic size, whose appearance has been reported at varying intervals and in many seas from the earliest times. The existence of a definite species of serpent of this sort is firmly believed in by most sea-faring men, many of whom have observed conformatory appearances. In a large number of instances these have been quite satisfactorily explained as tide-rows of sea-weed, etc., moved in an undulating fashion by wave action; as schools of porpoises moving in a single file, as giant squids swimming at the surface with their serpentine arms trailing behind, or in a variety of similar ways. There remain, however, a number of accounts whose circumstantiality and general agreement, together with the trustworthiness of the narrators, are such that many zoologists are convinced of the existence of such a monster and few are willing to deny it, although, in the absence of direct proof, a scientific skepticism prevails. That large fishes of serpentine form live in the open ocean is well known and these may prove to be the foundation of many of the sea-serpent stories. Among these are the ribbon-fishes (*Regaleidæ*) of which a number of species have been described. They have elongated, compressed, tapering bodies with oblong heads and toothless jaws and a continuous dorsal fin for the entire length, rising on the head into a prominent crest. Specimens of these fishes exceeding 20 feet in length have been actually washed ashore and examined by naturalists, and others of much larger size have been observed swimming swiftly at the surface, presenting a veritable sea-serpent aspect. One has been taken in the Bermudas, another on the coast of California and perhaps a score on other shores, while many more have been seen alive. The ribbon-fish is supposed to live in the depths of the sea and to come to the surface only occasionally. A slender eel-like shark (*Clamydoselache*) also lives in the deep waters of the Pacific, and if it attains a large size might justify reports of sea-serpents seen in that region. In past ages huge serpent-like creatures did actually roam the high seas, and some naturalists have considered the possibility of some of these persisting in the oceanic abysses down to the present times. The most important of these were the mosasaurs (*Pythonomorpha*), rather closely related to true serpents. During the Cretaceous period they were widely distributed and some reached a length of 60 or 70 feet and were extremely elongated and slender, with pointed heads and two pairs of paddle-like limbs.

The only true marine serpents of the present day are the sea-snakes (*Hydrophidæ*), which live in warm seas of most parts of the world, often far from land. All are of small size, with compressed tails, and are very venomous. They feed on fish, are viviparous and produce their young among the rocky shores of islands, etc.

Consult Goode and Bean, 'Oceanic Ichthyology' (Washington 1875); Gunther, 'Challenger Reports' (Vol. XXII, London 1887); Boulenger, 'Natural Science' (1892); Lee, 'Sea Monsters Unmasked' (London 1883); Oudemans, A. C., 'The Great Sea Serpent: An Historical and Critical Treatise' (London 1893); Wilson, A., 'Leisure-Time Studies' (ib. 1878).

SEA-SIDE GRAPE, a small tree (*Coccoloba uvifera*) of the family *Polygonaceæ,* which grows on the sea-coasts of Florida and the West Indies. It has clusters of edible fruit somewhat resembling currants, and a beautiful hard, violet-colored wood, which produces a red dye and a juice known as West Indian kino, that is nearly as valuable as the officinal kino.

SEA-SLUG, a nudibranchiate mollusk. See NUDIBRANCHIATA.

SEA-SNAKE, a venomous, marine East Indian serpent of the numerous family *Hydrophidæ.* See SEA-SERPENT.

SEA-SPIDER, a spider-like "no-body crab" of the class *Pantopoda;* also, a spider-crab (q.v.).

SEA-SQUIRT, an ascidian or tunicate (qq.v.), so named from the habit of emitting jets of water from the orifices of the body when touched or irritated in any way. Other less apt names found in British books are sea-pear, sea-pork, etc.

SEA-SWALLOW. See TERN.

SEA-TROUT, a popular name for various fishes, primarily for the common salmon-trout (*S. trutta*) of British waters. In other parts of the world various fishes more or less resembling it are called sea-trout, as the weak-fish (q.v.) in the southern United States.

SEA-URCHIN, an echinoderm of the class *Echinoidea* (q.v.), members of which differ from crinoids or starfishes in their compact spheroid, discoid or heart-shaped forms without arms or a stalk. The numerous species differ greatly in the number and arrangement of the calcareous plates forming the continuous test and in the character of the spines and other appendages with which the latter is studded. Of both fossil and living forms about 250 genera and 4,000 species are known. Although representatives of the 400 or so living species occur in most seas they are more numerous in warm waters, the West Indian fauna being the richest in the world. Regular sea-urchins are distributed widely in the littoral zone, but the irregular ones are especially characteristic of deep waters and the southern oceans, some of them extending to the utmost abysses. The shallow-water forms being subjected to the constant beating of the surf along the rocky shores which they chiefly inhabit are provided with a highly developed system of suctorial ambulacral feet, by means of which they are enabled to retain a hold. Many species also possess the remarkable power of boring into solid rock in which they excavate chambers exactly fitting them and increasing in size with their growth. Frequently the orifice representing the earlier dimensions of the chamber is too small to permit the urchin's escape and the animal is at once imprisoned in its cave and protected from any possibility of injury by the beating waves. The long-spined *Diadema* thus completely honeycombs the surface of the coral rock of the Bahama Islands, etc. Although this power of excavation is most displayed on soft calcareous rocks, the fact that solid granite is similarly bored in some parts of the world shows that it is not the result of a solvent action, but of a slow wearing away of the rock by the jaws and constant movements of the spines. Sea-urchins of most species swallow rock débris and sand in large quantities, digesting the abundant minute animal and plant life which it contains. Most of the species are gregarious, vast numbers collecting in certain areas on the sea-floor until their bodies completely pave the bottom. During the reproductive season, usually the summer, the ovaries and testes, found in separate individuals, become so greatly enlarged that they fill almost the entire interior of the test. Such forms are called sea-eggs, and this name is sometimes applied to regular sea-urchins generally. In some countries they are baked and eaten while in this condition. The egg-urchin (*Hipponoë esculenta*) of the West Indies is a large species so utilized. But very few species of sea-urchins are found in the shallow waters of the Atlantic Coast of the United States. The green sea-urchin (*Strongylocentratus drobachiensis*) is very common on the rocky shores of New England and the Pacific States. Besides the diatoms, etc., which it digests from the sand that it swallows, it also devours dead animals of every kind. Another example of the regular urchins is the purple or deep brown *Arbacia punctulata,* which is provided with very stout spines and is found from Cape Cod to the Gulf of Mexico. The species of *Diadema* and *Toxopneustes* occur only in the South Atlantic States. Of the flat or cake urchins (*Clypeasteroidea*) the sand dollars (*Echinarachinus parma* and *Mellita testudinata*) are examples. Both live in great numbers buried in the sand or lying on its surface on shoals, the first being most plentiful northward, the last southward. The heart urchin (*Moira atropos*) is the only example of the *Spatangoidea* that reaches even as far north as North Carolina in shallow water. Many interesting species of this and the other groups have been dredged in the deep water along the continental slopes and elsewhere. See ECHINODERMATA; ECHINOIDEA.

Consult Agassiz, 'Revision of the Echini' and subsequent articles in the Memoirs of the Museum of Comparative Zoology (Cambridge 1872); Agassiz, 'Seaside Studies' (Boston 1871); Lang, 'Lehrbuch der vergleichenden Anatomie' (Jena 1894).

SEA-WHIP. See GORGONIA.

SEABOARD AIR LINE RAILWAY COMPANY, the corporate name of a transportation system of southeastern United States. Its main arteries extend from Norfolk and Richmond, Va., southward to Tampa and Venice, Fla., and southwestward to Bessemer and Montgomery, Ala. Under a consolidation agreement of 11 Oct. 1915 the Seaboard Air Line Railway was consolidated on 16 Nov. 1915 under the laws of Virginia, North Carolina and South Carolina with the Carolina, Atlantic and Western Railway under the corporate name of the Seaboard Air Line Railway Company. The Carolina, Atlantic and Western Railway was a consolidation (April 1914) of the North and South Carolina Railway, the Charleston Northern Railway, the South Carolina Western Railway and the South Carolina Western Extension Railway, and had a total mileage owned of 330 miles and 86 miles under construction. Its lines extended from Hamlet, N. C., via Andrews, S. C., to Charleston, S. C., also from Lanes, via Andrews, to the port of Georgetown, S. C., also from McBee, S. C., through Hartsville, Darlington and Florence to a connection with the first-mentioned line at Poston, S. C., with branches to Sumter and Timmonsville. The 86 miles under construction were from Charleston to Savannah, which was opened to freight operation on 15 Oct. 1917 and to passenger operation on 5 Nov. 1917. The former Seaboard Air Line Railway was incorporated

10 April 1900 in Virginia as successor to the Richmond, Petersburg and Carolina Railroad, a 102-mile road between Richmond, Va., and Norlina, N. C. The Georgia and Alabama Railway was acquired by purchase 20 Feb. 1902; other roads were absorbed in November 1901, and the Florida Central and Peninsular Railroad on 27 June 1903, the system comprising lines extending from Richmond, Va., to Atlanta, Ga., and Jacksonville and Tampa, Fla., with numerous branches, embracing in all over 3,120 miles of road. In November 1909 the Atlanta and Birmingham Air Line Railway, 237 miles; the Florida West Shore Railway, 19 miles, and the Tallahassee, Perry and Southeastern Railway, 39 miles, were merged in the Seaboard Air Line Railway. Its total mileage at present is 3,461.34 miles. The property of the Atlantic, Suwanee River and Gulf Railroad Company, the mileage of which had previously been included in that of the Seaboard Air Line, was transferred during the fiscal year 1909–10. In 1911–12 the Seaboard Line absorbed the properties of the Seaboard and Roanoke Railroad and the Roanoke and Tar River Railroad. The Georgia and Alabama Terminal Company is practically merged with the Seaboard, although its corporate existence is maintained. In April 1917 the Seaboard Company took over control of the Tampa and Gulf Coast Railroad and the East and West Coast Railway. It controls by ownership of entire capital stock the Baltimore Steam Packet Company, which operates a fleet of steamers between Baltimore, Norfolk, Portsmouth and Old Point Comfort, Va.; the company also owns a substantial interest in the capital stock of the old Dominion Steamship Company and a one-sixth interest in the Richmond-Washington Company. Under traffic agreement with the Pennsylvania Railroad the Seaboard Air Line Company maintains through car service between New York, Philadelphia, Washington and the South. On 2 Jan. 1908 the company was placed in the hands of receivers. A reorganization plan was drawn up and declared operative on 10 Sept. 1909; on 4 Nov. 1909 the receivership was ended and the road returned to the stockholders. The company's equipment comprises 568 locomotives, 176 passenger coaches, 116 combination, baggage, etc., 105 express and baggage, 23 dining cars, seven mail and two parlor cars, 10,380 box cars, 2,596 flat cars, 70 stock cars, 3,969 gondola cars, 45 coal and coke, 187 caboose cars and 409 miscellaneous. The gross revenue for the year 1917 amounted to $30,345,146.01, showing an increase over 1916 of $4,160,658.76; the operating expenses amounted to $23,097,430.89; the increase over 1916 being $4,354,832.88; the net income was $854,067,14; a decrease of $757,943.48, due largely to war conditions, from the net income recorded in 1916 of $1,612,010.62. The general offices are at Portsmouth and Norfolk, Va.; and the New York office at 24 Broad street.

SEABRIGHT, N. J., borough in Monmouth County, on the Atlantic Ocean, five miles north of Long Branch, and on the Central of New Jersey Railroad. It is a popular seaside resort. Pop. 1,327.

SEABURY, sē'bŭ-rĭ, **Samuel,** American Protestant Episcopal bishop: b. North Groton, Conn., 30 Nov. 1729; d. New London, Conn., 25 Feb. 1796. He was graduated at Yale College in 1748, and three years later took a course in medicine at the University of Edinburgh. He did not, however, practise this profession, but entered at once upon a course of theological study. He was ordained deacon and priest in the English Church in London in December 1753. Returning to America in the following summer, he became rector of Christ Church, New Brunswick, N. J. In 1757 he took charge of Grace Church, Jamaica, L. I., and in 1766 of Saint Peter's, Westchester, N. Y. In the autumn of 1775 he was obliged on account of his Loyalist sympathies to leave his parish and he resided, during the greater part of the war, in New York. He wrote numerous articles in support of the Tory cause, of which he was one of the ablest advocates, and suffered much, even to imprisonment and exile, for his loyalty to the king, though when peace was declared no one was more faithful to the United States. Immediately after the articles of peace were received in New York, 10 out of the 14 Episcopal clergymen in Connecticut assembled at Woodbury to consider action as to the organization of the Church under the changed civic conditions. On the first formal ballot, they elected Dr. Seabury as bishop. He then sailed for England, and waited in London more than a year for consecration by the English bishops. Owing to the connection between the Church of England and the state, various political reasons stood in the way, and he finally determined, in pursuance of his original instructions, to apply to the Scottish bishops, who were in a more independent position. On 14 Nov. 1784, Seabury was accordingly consecrated at Aberdeen by the bishop and coadjutor-bishop of that see and the bishop of Moray and Ross. He then returned to America and there, in addition to his episcopal duties, assumed the rectorship of Saint James' Church, New London, which he held until his death. His jurisdiction was recognized over Rhode Island as well as Connecticut and afterward over Massachusetts; but the validity of his consecration was denied by many, partly owing to the prejudice excited by his former political attitude. In 1789, however, it was expressly affirmed by the General Convention. Seabury exercised much influence on the final shape of the constitution and liturgy of his Church, especially (in accordance with his agreement with the Scottish bishops) by insisting on the restoration of the oblation of the elements and invocation of the Holy Ghost in the Eucharistic office. He was a man of pronounced views, but of great simplicity, humility and self-sacrifice; and the value of his services to the infant Church can scarcely be overestimated. Consult Beardsley, 'Life and Correspondence of Samuel Seabury' (1881); Tyler, 'Literary History of the American Revolution' (1897).

SEABURY, Samuel, American Protestant Episcopal clergyman, grandson of Bishop Samuel Seabury (q.v.): b. New London, Conn., 9 June 1801; d. New York, 10 Oct. 1872. He was privately educated but took his A.M. at Columbia College in 1823. He was ordained in 1828, was professor of languages at Flushing Institute and Saint Paul's College in 1828–34 and in 1834–49 he edited the *Churchman.* He was rector of the church of the Annunciation, New York, in 1838–68, and from 1862 he was professor of Biblical learning at the General Theological Seminary, New York. Author of 'The Continuity of the Church of England in the Sixteenth Century' (1853); 'American Slavery Distinguished from the Slavery of English Theorists and Justified by Law of Nature' (1861); 'Theory and Use of the Church Calendar' (1872), etc.

SEABURY, William Jones, American Episcopal clergyman: b. New York, 25 Jan. 1837; d. 30 Aug. 1916. He was graduated at Columbia University in 1856 and received his master's degree there three years later. He took the degree of doctor of divinity at Hobart College in 1874, receiving the same degree from the General Theological Seminary in 1885. Meantime he studied law in the office of the late Stephen P. Nash, was admitted to the bar in 1858 and for a short time engaged in practice. Wm. Seabury succeeded his father in 1868 as rector of the church of the Annunciation, where he remained until 1898. He was appointed to the chair of ecclesiastical polity and law in the General Theological Seminary in 1873 and occupied it until his death. During the latter part of his tenure he was the senior professor in the service.

SEACOAST ARTILLERY. See Artillery.

SEAGER, Henry Rogers, American economist: b. Lansing, Mich., 21 July 1870. He was graduated at the University of Michigan in 1890, at the University of Pennsylvania in 1894, and later studied at Johns Hopkins University, and at Berlin, Halle and Vienna. He was professor of political economy at the University of Pennsylvania in 1897–1902; was connected with the faculty of Columbia University from 1902, and since 1905 has been professor of political economy there. In 1917 he was appointed secretary of the Shipbuilding Labor Adjustment Board at Washington, D. C. Author of 'Introduction to Economics' (1904); 'Economics Briefer Course' (1909); 'Social Insurance' (1910); 'Principles of Economics' (1917), etc.

SEAL, an engraved stamp bearing a device or inscription pertaining to the owner; also, the impression of such a stamp on a plastic substance, such as wax. A seal upon a document was originally a substitute for a signature; a seal upon a place of deposit was for security. The use of seals is of the highest antiquity, and one of the earliest and commonest forms was the signet-ring. In Egypt impressions of seals were made in fine clay, and attached to documents by slips of papyrus. The Romans use clay, bees-wax, and in the time of the empire lead for taking impressions. The use of bees-wax was introduced by the Normans; sealing-wax was invented in the 17th century. Documents in England are still sealed as a formality, but the true voucher to which alone any real importance attaches is the signature.

There are three seals officially used in England by or in name of the sovereign — the great seal, the privy seal and the signet. In the United States, on 4 July 1776, Congress appointed Benjamin Franklin, John Adams and Thomas Jefferson a committee to prepare a device for the great seal of the United States. The committee reported various devices. William Barton, of Philadelphia, was appointed to submit designs. Sir John Prestwich, an English antiquarian, suggested a design to John Adams in 1779. Combining the various designs of Barton and Prestwich, a seal was adopted 20 June 1782 as follows: Arms: Paleways of 13 pieces argent and gules; a chief azure; the escutcheon on the breast of the American eagle displayed proper, holding in his dexter talon an olive branch and in his sinister a bundle of 13 arrows, and in his beak a scroll with the motto: *E Pluribus Unum;* Crest: a glory breaking through a cloud proper and surrounding 13 stars; Reverse: A pyramid unfinished. In the zenith an eye in a triangle, surrounded with a glory proper, over the eye the words, *Annuit Cœptis.* Beneath the pyramid, MDCCLXXVI and words, *Novus Ordo Sæculorum.* The Confederate seal adopted by the Confederate Congress, 30 April 1863, was designed by Thomas J. Semmes, of Louisiana. The device represents an equestrian portrait of Washington, surrounded by the principal agricultural products of the Confederacy.

SEAL ISLANDS. See Lobos.

SEAL SKINS. See Fur Trade, The.

SEAL OF THE CONFEDERACY. See Great Seal of the Confederacy.

SEAL OF SOLOMON, Order of. See Orders, Royal.

SEAL OF THE UNITED STATES, Great. See Great Seal of the United States.

SEALING. See Seals.

SEALING-WAX, a resinous preparation used for securing folded papers and envelopes, and for receiving impressions of seals set to instruments. Ordinary red sealing-wax is made of pure bleached lac, to which when melted are added Venice turpentine and vermilion. Inferior qualities consist of common resin and red-lead, and black and other colors are produced by substituting appropriate pigments. Sealing-wax was invented in the 17th century. Its use for sealing letters has been generally given up in favor of mucilage, which when moistened fastens envelopes much more effectively and with greater rapidity than sealing-wax.

SEALS AND SEALING. Under this term are usually grouped two very widely different types of animals, the so-called fur seals and the hair seals or true seals. The former are not properly seals at all, but are allied rather to the bears, and were appropriately called "sea-bears" by their discovery. The fur seal yields a valuable fur; the hair seal has no fur, but a valuable oil is obtained from its fat and leather from its hide. The principal habitat of the hair seal is in the north Atlantic and Arctic oceans, although small groups of the commoner species are found widely scattered over the globe. The fur seals are more or less widely distributed throughout the southern seas, but are found at the present time chiefly in the north Pacific Ocean and Bering Sea. They are not found in the north Atlantic. The hair seal belongs to the suborder of the *Pinnipedia* and has feet not truly plantigrade, short with long claws. The posterior limbs only are used in swimming and are not susceptible

of bending forward at the knee. When on land the animal cannot walk or run, but merely wriggles with a belly-wise motion, the neck being short and the head scarcely capable of being raised. There is no external ear. The fur seals belong to the suborder of the *Gressigrada*. The feet are plantigrade, the anterior limbs only being used in swimming, having rudimentary claws, if any. The head and neck can be raised as in the bear. The external ear is moderately developed, and the animal can run or lope along the ground as do ordinary mammals and with considerable rapidity. The internal structure of the two animals shows equally marked differences. The hair seals, whatever their origin, must have come from a different parent stock and their relation to land carnivora must be more remote. Beyond the fact that both are carnivorous mammals, feeding on fish and perfectly adapted to life in the water, the two animals have little in common. In both the thick blubber goes with life in the icy waters of the north. They resort, in one case to certain island shores, in the other to the ice floes, to bring forth and rear their young. But these resemblances, associated with aquatic habitat, are only analogies and have no value in scientific classification. In structure, appearance, degree of intelligence, habits, disposition and method of locomotion, the two types are entirely distinct and their evolution as pelagic animals has been along separate lines.

Hair Seals.— The hair seals are found off the coasts of Newfoundland and Labrador, in the waters of the Gulf of Saint Lawrence, in the Greenland seas, and about the island of Jan Mayen, and in the White and Caspian seas. In these places they occur in sufficient numbers to make their hunting profitable. In small isolated groups they are found about the British Isles, among the pelagic islands of the southern seas and about the island shores of the Pacific Ocean and Bering Sea. The principal species hunted are the saddleback or harp seal (*Phoca grænlandica*), so named from the peculiar marking thought to resemble an ancient harp; the rough or ringed seal (*P. fætida*), having its name also from color markings; the harbor or common seal (*P. vitulina*), so-called because of its wide distribution and its fondness for bays and sheltered waters; the Caspian seal (*P. caspica*), confined to the sea of that name; the hooded seal (*Cystophora cristata*), so named because of its crest or hood; and the gray seal (*Halichærus grypus*). The two last are unimportant, being taken only when met with in search for other seals. The harbor seal is the commonest form and most widely distributed. But the most important in point of numbers and value of its products is the harp seal, the seal of Newfoundland, of the Greenland seas and the Arctic.

The hair seals show considerable variation in size and coloration. The harp seals are in general whitish or yellowish-white, the nose and head black, the throat and chin spotted with black. The harbor seal is yellowish-gray above, varied with irregular spots of dark brown or black, and yellowish-white beneath with smaller spots. The ringed seal is the smallest form, the gray seal the largest, attaining a length of eight to nine feet. The ordinary species are from five to six feet in length and weigh from 60 to 300 pounds. The female is slightly smaller than the male, in the case of the harp seal about one-fourth less; but there is no such wide disparity between the sexes as exists in the case of the fur seals. The animals are said to be monogamous. With the exception of the harbor seal, which is non-migratory, the hair seals obey a more or less well-defined semi-annual migration, although their movements are nowhere so definite as those of the fur seals of the north Pacific Ocean. In a general way the herds move southward on the approach of winter, returning to the north and eastward in the spring as the ice recedes. They are found, however, with unfailing regularity at certain definite localities in the breeding season, as for example, the ice fields off Newfoundland, and about Jan Mayen Island. In the vicinity of Newfoundland the young are born between the middle of February and the latter part of March. At Jan Mayen the season is somewhat later, approaching April. The single young, whitish in color at birth, changing to darker, grows very rapidly, attaining a weight and size approximating that of its mother in six weeks or two months. It remains on the ice, the mother returning from her feeding excursions to nourish it. In the course of a month it takes to the water, reluctantly at first, finding it necessary to learn to swim. The young seals form the most valuable part of the catch and yield the best quality of oil. The food of the hair seal consists of fish, in certain species supplemented by mollusks and crustaceans.

Of the various sealing grounds or districts, by far the most important is that of Newfoundland, to which the seals flock in February of each year in «countless numbers.» The sealing fleet clears principally from the port of Saint Johns, sailing vessels being allowed to depart as early as 1 March, steam vessels on the 10th, and to begin sealing as soon as the seals can be found. The sealing season extends until the 1 May. In addition to the sealing on the ice the hunting is also carried on by means of nets and guns along the shores of Newfoundland and the Gulf of Saint Lawrence. This form of sealing has been practised from the earliest times and constituted the beginning of the industry, which, however, attained no considerable importance prior to the beginning of the 19th century, the yearly catch probably not exceeding 5,000 seals. Vessels seem to have been first used in this sealing in the year 1763. For the year 1805 we have record of a catch of 81,000. We know that in 1807 the sealing fleet numbered 30 vessels. The catch for 1815 was 126,000 and that for 1822, 306,000. In the period from 1830 to 1850 the Newfoundland sealing industry was at its maximum development. The fleet numbered approximately 400 vessels, with crews aggregating 10,000 men and an annual catch ranging from 500,000 to 700,000 seals. From the close of this period the industry declined, and fewer but larger vessels were employed. In 1871 we find the fleet reduced to 168 vessels. The catch for 1856 was 361,000. It rose again in 1876 to the 500,000 mark, but in 1880 it fell to 223,000. For the 21 years (1881–1901) it averaged 226,000 seals. The catch for 1907 was 245,051 seals and for 1913, 272,065. For the period 1906–13 the ex-



COMMON HARBOR SEAL (*Phoca Vitulina*)

of bending forward at the knee. When on land the animal cannot walk or run, but merely wriggles with a belly-wise motion, the neck being short and the head scarcely capable of being raised. There is no external ear. The fur seals belong to the suborder of the *Gressigrada*. The feet are plantigrade, the anterior limbs only being used in swimming, having rudimentary claws, if any. The head and neck can be raised as in the bear. The external ear is moderately developed, and the animal can run or lope along the ground as do ordinary mammals and with considerable rapidity. The internal structure of the two animals shows equally marked differences. The hair seals, whatever their origin, must have come from a different parent stock and their relation to land carnivora must be more remote. Beyond the fact that both are carnivorous mammals, feeding on fish and perfectly adapted to life in the water, the two animals have little in common. In both the thick blubber goes with life in the icy waters of the north. They resort, in one case to certain island shores, in the other to the ice floes, to bring forth and rear their young. But these resemblances, associated with aquatic habitat, are only analogies and have no value in scientific classification. In structure, appearance, degree of intelligence, habits, disposition and method of locomotion, the two types are entirely distinct and their evolution as pelagic animals has been along separate lines.

Hair Seals.— The hair seals are found off the coasts of Newfoundland and Labrador, in the waters of the Gulf of Saint Lawrence, in the Greenland seas, and about the island of Jan Mayen, and in the White and Caspian seas. In these places they occur in sufficient numbers to make their hunting profitable. In small isolated groups they are found about the British Isles, among the pelagic islands of the southern seas and about the island shores of the Pacific Ocean and Bering Sea. The principal species hunted are the saddleback or harp seal (*Phoca grœnlandica*), so named from the peculiar marking thought to resemble an ancient harp; the rough or ringed seal (*P. fœtida*), having its name also from color markings; the harbor or common seal (*P. vitulina*), so-called because of its wide distribution and its fondness for bays and sheltered waters: the Caspian seal (*P. caspica*), confined to the sea of that name; the hooded seal (*Cystophora cristata*), so named because of its crest or hood; and the gray seal (*Halichœrus grypus*). The two last are unimportant, being taken only when met with in search for other seals. The harbor seal is the commonest form and most widely distributed. But the most important in point of numbers and value of its products is the harp seal, the seal of Newfoundland, of the Greenland seas and the Arctic.

The hair seals show considerable variation in size and coloration. The harp seals are in general whitish or yellowish-white, the nose and head black, the throat and chin spotted with black. The harbor seal is yellowish-gray above, varied with irregular spots of dark brown or black, and yellowish-white beneath with smaller spots. The ringed seal is the smallest form, the gray seal the largest, attaining a length of eight to nine feet. The ordinary species are from five to six feet in length and weigh from 60 to 300 pounds. The female is slightly smaller than the male, in the case of the harp seal about one-fourth less; but there is no such wide disparity between the sexes as exists in the case of the fur seals. The animals are said to be monogamous. With the exception of the harbor seal, which is non-migratory, the hair seals obey a more or less well-defined semi-annual migration, although their movements are nowhere so definite as those of the fur seals of the north Pacific Ocean. In a general way the herds move southward on the approach of winter, returning to the north and eastward in the spring as the ice recedes. They are found, however, with unfailing regularity at certain definite localities in the breeding season, as for example, the ice fields off Newfoundland, and about Jan Mayen Island. In the vicinity of Newfoundland the young are born between the middle of February and the latter part of March. At Jan Mayen the season is somewhat later, approaching April. The single young, whitish in color at birth, changing to darker, grows very rapidly, attaining a weight and size approximating that of its mother in six weeks or two months. It remains on the ice, the mother returning from her feeding excursions to nourish it. In the course of a month it takes to the water, reluctantly at first, finding it necessary to learn to swim. The young seals form the most valuable part of the catch and yield the best quality of oil. The food of the hair seal consists of fish, in certain species supplemented by mollusks and crustaceans.

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COMMON HARBOR SEAL (*Phoca Vitulina*)

ports of seal hides and oil for Newfoundland reached a total value of $5,208,579. The Newfoundland sealing is essentially a British industry, the major part of the fleet hailing from the ports of Saint Johns and Conception Bay, the English vessels from Dundee and Peterhead. The principal species taken in this catch is the saddleback or harp seal (*Phoca grænlandica*), which constitutes also the bulk of the catch in the Jan Mayen and Greenland sealing.

Next in importance comes the sealing in the vicinity of Jan Mayen Island. This is confined to an area of about 400 miles diameter about the island. The seals arrive in this region somewhat later and some British vessels, after completing the Newfoundland season, go on to Jan Mayen. This sealing is also participated in by German and Norwegian vessels, the former sailing from Hamburg, the latter from Tönberg and Tromsö. The area covered is so limited that this sealing is very destructive. In 1876 it became necessary to establish a closed season for the Jan Mayen sealing, which was accomplished by an agreement among the nations concerned by which sealing in the area between lat. 67° and 75° N. and long. 5° E. and 17° W. should not begin before 3 April. The records for the Jan Mayen sealing extend back to 1720. The catch by a fleet of 19 vessels from Hamburg in 1760 is said to have been 44,000. For 1790 the catch was 45,000; for 1850, 48,000. We learn that in 1868 a fleet of 15 Norwegian vessels, carrying 600 to 700 men, took part in this sealing, the catch for five years preceding this date being approximately 65,000 a year. The British fleet has been smaller, ranging, in the period 1865 to 1871, from 4 to 12 vessels, taking a catch of from 16,000 to 90,000. The best estimates available for the total catch of the Jan Mayen sealing for this period would seem to be about 200,000 seals a year. Since 1880, despite the regulations, this sealing has greatly declined. The statistics for the German and Norwegian vessels are not available, but those for the British fleet are given each year by Thomas Southwell in the 'Zoologist' (London). From this source we learn that the catch for 1881 was 27,894; for 1885, 26,448; for 1887, 1,100; for 1889, 15,079, and for 1891, 1,560. Since 1895 the Jan Mayen sealing has been abandoned by the British fleet.

On the west coast of Greenland a considerable catch of seals is made by the natives. The flesh of the animals is sought for food and the skins for clothing, and they form the chief resources of the inhabitants of the region. The product of this sealing formerly, according to Dr. Rink, in his account of Greenland, averaged about 89,000 seals each year. In recent years it is said to have fallen off to about one-half, probably from the same cause that has affected the Jan Mayen sealing.

At Nova Zembla and in the White and Caspian seas are important sealing grounds worked by the Russians. Professor Schultz in his account of the seal and other fisheries of these waters speaks of the White Sea sealing as covering an area of 230 miles and engaging 2,000 hunters. The methods of sealing and the species sought are the same as in the North Atlantic. The catch has been estimated at from 65,000 to 75,000 a year. The Caspian Sea sealing is more important, the annual catch for five years prior to 1882, as given by Professor Schultz, was 130,000. Statistics regarding the results of sealing in the White and Caspian seas in recent years are not available.

The methods employed in taking the seals vary with the different conditions under which the animals are found. Along shores of Newfoundland nets and sealing frames are used. A common form of net is one making with the shore an oblong enclosure, the ends capable of being lowered as the animals approach and raised after they are within. They are then frightened until they have hopelessly entangled themselves in the meshes of the suspended net. Two men manage such a net, which may be as much as 150 fathoms in length and in a single such net 1,800 seals are said to have been taken in one season. The natives of Greenland use the net also, but employ chiefly the harpoon or spear with wooden shaft and detachable head, the latter secured to the boat by means of a cord by which the captured animal is drawn up to the hunter and dispatched with the club or knife. Stationary nets are also used in connection with the rocks where seals are accustomed to haul out to rest and also about their breathing holes in the ice. Deadfalls, sealing hooks and other devices are used as circumstances warrant. But the really important method of capture is that used upon the ice fields where the seals are found congregated in immense herds. When a vessel has sighted seals its hunters are put ashore on the ice. They round up the animals, cutting them off from the open water and then club them over the head. When the seals are all killed the hunters remove the skins, with the adhering layer of blubber, and drag them back to be stored in the ship. This process is repeated layer of blubber, and drag them back to be found, or a cargo is obtained. At port the fat is separated from the skin and the latter preserved by salting. The fat is rendered into oil. In former times this was accomplished by throwing it into huge vats to melt by its own weight under the action of the sun and weather. In recent years this method has been replaced by the more rapid one of rendering by steam. The oil thus obtained is used as a lubricant and luminant and in the manufactures. The hides are made into leather and used for a variety of purposes, among them the covering of trunks and knapsacks.

The vessels used in the sealing industry were originally small sailing schooners. Steam vessels began to be used about 1866, and have gradually superseded the sailing vessels. Of the fleet of 107 vessels of 1873, one-fifth are said to have been steamers. At the present time steam vessels are employed almost exclusively in the Nedfoundland and Jan Mayen sealing. The ships must be staunchly built with iron-shod prow for breaking through the ice and with strength to withstand the pressure when caught in the shifting ice. The business is a hazardous one, vessels not infrequently being wrecked by storms or ground to pieces between the icebergs. Vessels sometimes fail to come up with seals and so return empty. But the catches are in the main good and at times exceptionally so. Catches of 30,000 to 40,000 seals are not infrequent for single vessels, and each animal is worth from one to

three dollars, a rich booty for a season of from six weeks to two months. In the case of steam vessels the men of the crew share one-third of the catch among them, two-thirds going to the owners of the vessel. The catch is divided equally between crew and owners in the case of sailing vessels.

It is not easy to bring together in any complete way the statistics of the hair-seal industry. For the period 1881 to 1901, Mr. Southwell, in his annual notes in the 'Zoologist' on the 'Seal and Whale Fishery,' gives rather complete data for the British fleet taking part in the Newfoundland and Jan Mayen sealing. His figures do not, however, include the shore hunting and the seals taken by sailing vessels. The following table is compiled from his annual notes:

CATCH OF STEAM SEALING VESSELS OF THE BRITISH FLEET.

YEAR	Greenland sealing		Newfoundland sealing	
	Vessels	Catch	Vessels	Catch
1881	.....	23,894	13	139,985
1882	8	22,142	13	63,204
1883	13	37,920	31	286,000
1884	12	39,700	20	192,175
1885	10	26,448	19	211,587
1886	3	4,500	18	195,396
1887	1	1,100	20	177,733
1888	4	13,388	16	210,810
1889	4	15,079	19	303,287
1890	7	6,603	19	209,000
1891	5	1,560	19	343,495
1892	5	3,478	20	349,369
1893	3	325	22	129,060
1894	3	4,712	21	152,821
1895	.....	.....	20	270,058
1896	.....	.....	20	187,516
1897	.....	.....	21	126,628
1898	.....	.....	18	241,708
1899	.....	.....	18	268,787
1900	.....	.....	19	353,276
1901	.....	.....	19	345,380

Of the value of the total product of the industry various estimates are available. The catch of 1857 of 500,000 seals is valued at $2,125,000. This sum was divided among 375 vessels and 13,600 men. The catch of 1871 of 486,262 seals is said to have yielded 6,943 tons of oil valued at $972,000, the skins themselves being valued at $486,262, making a total of $1,458,262. These figures related to the Newfoundland catch. For the years 1895–1901, Professor Southwell gives the following estimates for the catches of these years as shown in the preceding table:

1895	£77,824
1896	55,362
1897	32,564
1898	80,000
1899	68,527
1900	96,720
1901	77,819

The following exports of seal products for Newfoundland are recorded in 'The Statesman's Yearbook':

YEAR	Seal skins	Seal oil	Total
1906	$314,048	$297,430	$611,478
1907	164,509	447,967	612,476
1908	140,137	308,997	449,134
1909	433,620	252,262	685,882
1910	460,220	459,814	920,034
1911	275,287	385,250	660,537
1912	380,693	296,519	677,212
1913	321,551	270,275	591,826
1916	206,449	403,640	610,089
Totals	$2,692,514	$3,122,152	$5,818,668

The number of seals taken in 1916 is given as 241,302, and for 1917 only 196,228.

When the hair-seal industry was in its prime its total catch from the various grounds numbered about 1,000,000 seals annually, at a value of approximately $3,000,000. The catch has fallen off in recent years, perhaps to one-half, but the industry is still a valuable one and worthy of such measures as may be necessary to preserve and perpetuate the race of animals upon which it depends. The fate of this industry in the North Atlantic Ocean would seem to be equally important with that of the fur-seal industry in the North Pacific Ocean. The danger which seems to threaten in one case is much the same as in the other — indiscriminate and wasteful killing.

Fur Seals.— The fur seals or sea bears constitute two groups or genera, *Arctocephalus* (*A. townsendi,* Guadalupe Island; *A. philippi,* Galapagos Islands; *A. australis,* southern coasts of South America and neighboring islands; *A. forsteri,* coasts of New Zealand and southwestern Australia; *A. delalandi,* islands off South Africa; *A. gazella,* Kerguelen and Prince Edward Island), once numerous and widely distributed among the pelagic islands of the southern hemisphere but now practically extinct through indiscriminate slaughter in the greater part of its habitat, remnants of importance only existing on Lobos Island, in the mouth of the River Plata in Uruguay, and on the islands of Cape Horn, receiving in both places government protection; and *Otoës* (*Callorhinus*), *O. ursinus,* Commander Islands; *O. alascanus,* Pribilof Islands, in Bering Sea, and *O. curilensis,* Kurile Islands and Robben Island, in the Sea of Okhotsk, limited to the waters of the North Pacific Ocean now the sole variety of any considerable commercial importance.

The typical male fur seal or «bull» attains maturity at about the age of seven years, weighs from 400 to 500 pounds, is about six feet in length and has a girth of four and one-half feet. His color is blackish or dark brown, with yellowish-white water hairs, especially long on the back of the neck, forming the so-called «wig» or mane. The fore-limbs or flippers, with broad membrane connecting and extending beyond the toes, are used in swimming. The animal stands erect and runs or lopes along the ground when on land. The adult female or «cow» is smaller, averaging about 80 pounds in weight, with length and girth in proportion. Her fur is of varying shades of brown. She bears her first young or «pup» at the age of three years. The breeding grounds are bowlder-strewn beaches or rocky-hill slopes near the shore, and on these the gregarious instinct of



A Herd of Fur Seals, Gorbatch Rookery, Pribilof Island, Alaska

the animals leads them to congregate in closely set masses called "rookeries." The fur seals are polygamous, each adult bull getting about him as many cows as he can control; these family groups forming the unit of rookery life are called "harems," and range in size from 1 to 100, depending upon advantage of location, the average size being about 30. The bulls reach the islands early in May and select their places, awaiting the arrival of the cows which begins early in June. The incoming is gradual, the number on the rookeries growing steadily to a climax at about the middle of July, when the greatest number (not, however, more than one-half at any one time) are present, the number diminishing to one-fourth at and after the close of the breeding season about the 1st of August. The single pup, weighing 10 to 12 pounds and black in color, soon changing to gray, is born within 6 to 48 hours after the arrival of the mother. Within a week she is served by the bull and goes away to sea to feed, returning at gradually lengthening intervals to nourish her young, which remains on shore. The young males of one, two, three and four years, called "bachelors," herd by themselves on beaches adjacent to but distinct from the breeding grounds, the fact upon which depends the principle of land killing by which only the superfluous males are taken. The bulls having fasted since their arrival in May go away early in August to feed. The pups learn to swim at the age of six weeks and in November, on the approach of winter, swim away with their mothers to the south. The winter migration of the Pribilof Islands herd extends to the latitude of Southern California, which is reached by a more or less direct route through the ocean, late in December. The return journey is made more slowly and follows the outline of the coast. The Commander Island seals make a similar journey to the southern extremity of Japan and return on their course. The seals of Robben Island have their migration route in the island sea of Japan. The fur seals find their food, chiefly squid (*Gonatus amœnus*) and a small smelt-like fish (*Therobromus callorhini*), in deep water, and their feeding grounds in Bering Sea and on the spring migration lie in a general way along the 100-fathom curve.

We owe our first knowledge of the fur seals of the north Pacific to Georg Wilhelm Steller, the naturalist of Vitus Bering's second voyage, in 1841. On the return trip Bering's ship was wrecked on one of the two islands now known in his honor as the Commander Islands. The survivors of the wreck wintered on Bering Island where the great commander died. Steller succeeded to the command of the expedition and during the winter made a study of the fur seals or sea bears, among other animals which he found on the island, the great rookeries of Bering Island furnishing him with a wealth of material.

The Commander Islands lie in Bering Sea in lat. 55° N. and long. 166° E., 97 miles to the eastward of the peninsula of Kamchatka and 180 miles to the westward of the island of Attu, the westernmost land of the Aleutian Archipelago. They are barren, mountainous stretches of land of no interest or importance aside from the fur-bearing animals found upon them. In addition to the fur seals, the blue or Arctic fox was once numerous, as was also the sea-otter, the latter now very scarce because of excessive hunting. The sea-lion and the sea-cow or manatee were also found in numbers about these islands. The latter is now extinct. Bering Island is the larger of the two. It is about 35 miles in length by an average width of about 15 miles. Its companion, Copper Island, is very much smaller. Small villages exist on each island in which the native sealers and the officials of the government and commercial company live. The islands belong to Russia, having remained in her possession since their discovery in 1741.

The Pribilof Islands are the home of the most important of the northern fur seal herds. They lie in the eastern portion of Bering Sea, about 200 miles from Cape Newenham on the mainland of Alaska and a like distance from the island of Unalaska, in lat. 56° N. and long. 170° W. There are five islands in the group, of which two only, Saint Paul and Saint George, are important, the former having an extreme length of 13 miles and a width of about 7. Saint George Island is about one-half as large. Like the Commander Islands they were unknown to aboriginal man. They were discovered in 1786 by Gerassim Pribilof, a Russian navigator in the employ of the trading companies then engaged in exploiting the resources of the Commander Islands and already seeking new fields. Each island has a native village with its company store, Greek-Russian church and American school. The village of Saint Paul numbers about 200 people, that of Saint George half as many, natives from the Aleutian Islands brought over in the early days by the Russians to work the fur seal industry. The natives are paid for their labor at so much per skin, the present price being 50 cents. The sum thus earned is treated as a community fund and is divided among the heads of families on the basis of age and skill. When the annual quota numbered 100,000 skins the natives were rich. Since 1890 the catch has declined steadily, not exceeding an average of 15,000 annually for the period ending 1911. In 1912 the commercial catch was cut off for five years. Congress has by annual appropriation supplemented the earnings of the sealers and is now maintaining them as wards of the government. The affairs of the islands were until 1904 administered by the Treasury Department through agents residing on the islands. In 1904 the islands were transferred to the Department of Commerce and managed as a separate division. Since 1909 they have been under the special charge of the Bureau of Fisheries. The Pribilof Islands were joined with the Commander Islands, and remained under the control of Russia until 1867, when they passed, with the Territory of Alaska, into the possession of the United States.

After many experiments, some of them disastrous, the Russians worked out a system of management of the fur seal industry which with slight modifications is still in vogue on the islands. The important feature of this system is the absolute protection of the female herd. The land sealing is confined to the young males of two and three years of age, 29 out of every 30 of which are superfluous for breeding purpose, owing to the polygamous habit of the

animals. These young males, as they rest on their hauling grounds, are surrounded at night by the sealers, rounded up and driven slowly inland in great droves of from one to 3,000. On the killing grounds the large droves are gradually broken up into small groups or pods of from 20 to 50. From these men armed with stout clubs knock down those of killable size, leaving those too large or too small to escape and return to the water. The skins are removed by other workers. A crew of 20 to 30 men will thus kill and skin 1,500 to 2,000 seals in half a day. The different hauling grounds are driven in succession during the killing season, which lasts from 1 June until about 1 August, after which time the skins begin to get stagey, owing to the shedding of the water hair. The skins are gathered up and salted in kenches. After remaining in the salt for 10 days or two weeks they are taken out and wrapped in bundles, two in each, and are ready for shipment. They are eventually shipped to London, where practically all the seal-skins of the world are prepared for use. The two important processes in the treatment of the raw skin are the removal of the coarse water hairs, which have to be carefuly plucked out, and the dyeing of the fine under fur. Both require the greatest skill, and when the skin has been thus dressed and dyed its value has been doubled. When the United States came into possession of the Pribilof Islands in 1868, following the example of Russia, she leased the fur seal industry to the Alaska Commercial Company, which controlled the industry for a period of 20 years. The company paid a rental of $55,000 a year for the islands and a royalty of $3 on each skin taken. During the period of its lease the company took an average annual quota of 100,000 skins. The government also derived revenue from import duties on dressed sealskins brought over from London for consumption in this country. In all, the government received during this first period of 20 years, in rental, royalty and import duties, nearly $13,000,000, or about twice the total cost of the entire Territory of Alaska. It is needless to say that the industry proved a source of wealth to the company controlling it. The same company leased the Commander Islands from Russia and took there a quota of about 50,000 skins a year. In 1890 the fur seal industry of the United States passed into the hands of the North American Commercial Company for a term of 20 years. The terms of the new lease were more advantageous to the government, the royalty on each skin being approximately $10. The fur seal herd had, however, suffered a serious decline in its breeding stock and this became evident in the first year of the new lease when only 21,000 skins were taken. A catch of 30,000 skins was taken in 1896, but the average for the 20 years did not exceed 15,000 skins. The cause of this decline was found in the development of a rival sealing industry, the hunting of the seals in the open sea while on their migrations and feeding excursions.

Pelagic sealing, as this hunting is now called, is the outgrowth of a custom practised by the Indians of the Northwest Coast from the earliest times. Going out from the shore in the vicinity of Cape Flattery and Vancouver Island in their canoes they captured with the spear such stragglers from the migrating herd as came within their reach. The number of animals taken in this way was small, probably not exceeding 5,000 a year, until 1879. The skins found their way to the markets through the traders and, as sealskins increased in value, this irregular source of supply became an object of attention. In 1879 vessels began to be used to convey the Indians and their canoes out to the main body of the herd, to remain with them, affording shelter at night and in time of storms, and enabling the hunters to move with the progress of the herd. From a single vessel in 1879 the pelagic industry expanded enormously until in 1891 the sealing fleet numbered 122 vessels, each with from 5 to 20 sealing crews, and in 1894 it made a total catch of 143,000 seals. From this point the pelagic catch declined steadily with the diminishing herd. In 1902 it numbered about 15,000 seals or about the average land catch at that time. The methods of pelagic sealing may be described as follows: When the sealing vessel comes into sight of seals its boats are lowered and the hunters put off to windward in diverging directions. The spearsman stands in the bow and the steersman manages the boat. The seals are usually found sleeping on the surface of the water. The boat approaches noiselessly and the spear is thrown by means of a long detachable shaft. The spear head is attached to the boat by a line, and when the captured animal is tired out it is drawn up to the boat and killed with a short club. If the shotgun is used the animal is similarly approached and, after being shot, the body is quickly recovered with a gaff to prevent its sinking. The operations of the sealing fleet were gradually extended from the vicinity of the Straits of Fuca until they covered the entire migration route of the Pribilof herd, from the Santa Barbara Channel to the passes of the Aleutian chain. Finally it entered Bering Sea and attacked the herd on its summer feeding ground. In a similar way the pelagic fleet covered the migration route of the Commander herd.

Pelagic sealing was necessarily indiscriminate, as the sex of the animal could not be distinguished in the water and the hunter tried to kill every animal found. The killing of the males on land naturally left the herd as found at sea composed chiefly of females. The killing of the female seal on the spring migration involved the death of her unborn offspring. When killed in Bering Sea in August and September her dependent young was left to starve on the rookeries. Investigations of the pelagic catch in 1895 and 1896 showed the percentage of females in the pelagic catch for these years to be 63 and 84 per cent respectively. In the latter season 20,000 starved pups were counted upon the rookeries of Saint Paul and Saint George, their mothers having been killed at sea.

Aware of the disastrous effects of pelagic sealing, and acting under shadow of a claim made by Russia in 1820 to absolute jurisdiction over Bering Sea in the interests of her fur seal herd, a claim since found untenable, the United States in 1886 began seizing sealing vessels operating in Bering Sea, among them Canadian vessels. This brought on a diplomatic discussion with Great Britain which dragged along until 1892, when the two nations agreed upon a treaty submitting to a court of arbitration the question of jurisdiction in Bering Sea, and of what regulations, if any, were necessary for the protection and preservation of the fur seal herd when beyond the ordinary territorial limit of three miles. This tribunal of arbitration met in Paris in the spring of 1893 and rendered its decision in August of the same year. The decision on the legal questions involved was adverse to the contention of the United States and, as provided in this event, a set of regulations was formulated for the protection of the herd, to be enforced jointly by the two nations. These regulations provided, after the analogy of game laws, for a closed season in May, June and July, when all sealing should be suspended, and for a closed zone of 60-miles radius about the islands, within which no sealing whatever should be allowed. The closed season covered the breeding period, the protected zone was supposed to provide a safe feeding ground for the mother seal while her young was dependent upon her. The regulations, however, failed of their object, because the mother seal does not feed within the protected area, but far outside of it. She was, therefore, taken by the pelagic sealer as before, and her young was left to starve. The largest catch in the history of pelagic sealing, that of 1894, was made in the first season of the operation of the very regulations designed to so limit and restrict pelagic sealing as to protect and preserve the herd.

In 1896, because of the continued decline of the fur seal herd, it was agreed between the United States and Great Britain to reopen the question with a view to a possible revision of the regulations, and each nation sent a scientific commission into Bering Sea to inquire into all facts relating to seal life. The commission for the United States was under the direction of President David Starr Jordan of Stanford University, California, that for Great Britain, under the direction of Prof. D'Arcy Wentworth Thompson of University College, Dundee, Scotland. At the close of the investigations which covered the seasons of 1896 and 1897, the two commissions met at Washington in a joint conference known as the Conference of Fur Seal Experts, and after a full discussion of the results of their labors reached an agreement on all essential facts, establishing the fact of decline, its probable rate and its cause. The cause was fixed as the killing of females at sea involved in pelagic sealing and the agreement foreshadowed — commissions having no power to consider ways and means — the abolition of pelagic sealing as the only means of saving the herd. On the basis of this agreement the fur seal question passed into the hands of the Joint High Commission called at Quebec in 1898 to consider this among a number of other questions in dispute between the United States and Canada. Unable to reach an agreement on the boundary dispute this Joint Commission accomplished nothing in the fur seal matter. In 1903 a Japanese sealing fleet joined the Canadian and as the Japanese sealers were not bound by the regulations of the Paris Award they were able to establish themselves on the three-mile territorial limit about the islands and to operate throughout the summer. Under these conditions the damage to the herd was greatly increased and its extermination threatened. In 1911 negotiations for the abolition of pelagic sealing were taken up anew, Russia and Japan participating in them. The conference was held at Washington and the treaty, suspending pelagic sealing for 15 years, was signed by the United States, Great Britain, Russia and Japan on 7 July. It was duly ratified and went into effect in the season of 1912. This treaty provided that the United States and Russia, as owners of the principal seal herds, should share their land catches with Canada and Japan, 15 per cent each to each, in return for the abandonment of pelagic sealing. Unfortunately in enacting the law necessary to give this treaty effect Congress added a clause suspending land sealing on the Pribilof Islands completely for five years and limiting its extent for nine further years, practically the full life of the treaty. This law was enacted 24 Aug. 1912, and in the four seasons which have passed it has caused a loss of approximately $2,000,000 to the three nations concerned under the treaty. If its provisions are fully carried out the loss will reach a total of not less than $4,500,000 and the excess of male life created upon the rookeries will be injurious in high degree to the herd.

With the close of the lease of the North American Commercial Company in 1909 the government entered upon the direct control and management of its fur seal herd. The catch of 13,000 skins for 1910 was taken by the government agents and sold in London for $437,000, yielding to the treasury nearly four times as much as would have been received under the leasing system. The similar catch of 1911, amounting to 12,000 skins, brought $423,000. The catch and attendant income should not have fallen below the figure of 1911 for with that season pelagic sealing ceased and the herd began to increase.

It is probable that in the days of its greatest prosperity (1870–85) the fur seal herd of the Pribilof Islands numbered 2,500,000 animals of all classes. In 1912, at the time of its release from the drain of pelagic sealing, the herd numbered approximately 250,000 animals. The Russian herd of the Commander Islands, originally about one-half the size of the American herd, had suffered practically the same proportionate decline. These herds under protection at sea will increase year by year at approximately 15 per cent until they again reach their maximum limits, determined in all probability by the question of food supply which they must find in the open sea. In 1919 the Alaska herd was estimated at 600,000.

In addition to the fur seal herds of the north Pacific Ocean two herds of the southern hemisphere yield a limited supply of skins. One of these is the herd of Lobos Island off the mouth of the river La Plata, in Uruguay, yielding 12,000 to 15,000 skins annually, and the other, on islands off Cape Horn, yielding 5,000 to 10,000 annually.

The herd of the Pribilof Islands alone has yielded, since its discovery in 1786, approximately 6,000,000 sealskins. In its present state it is capable of yielding an annual catch of 15,000 skins and this will rise steadily to a maximum of 100,000 to 150,000. Sealskins in the past 20 years have ranged in value from

$20 to $50 each. The herd is a governmental resource of great importance and value.

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GEORGE ARCHIBALD CLARK,
Secretary of the Fur Seal Commission 1896–97,
Late Academic Secretary of Leland Stanford, Jr., University.

SEALSFIELD, sēlz'fēld, **Charles,** pseudonym of KARL ANTON POSTL, Austrian novelist: b. Poppitz, Moravia, 3 March 1793; d. Solothurn, Switzerland, 26 May 1864. He early entered a monastery and was ordained in the priesthood, but in 1822 fled to Switzerland and thence to the United States where he lived in 1822–26 and 1827–30. In 1829 he edited in New York the *Courier des Etats Unis,* and after 1832 made his residence chiefly in Switzerland, though he visited the United States at intervals. He subsequently engaged in novel writing, his work creating a sensation in Germany. His publications include 'Die Vereinigten Staaten von Nordamerika' (1828); 'Der Legitime und die Republikaner' (1833); 'Lebensbilder aus beiden Hemisphären' (1835–37); 'Das Kajütenbuch' (1840); 'Süden und Norden' (1842–43), etc.

SEAMAN, Louis Livingston, American surgeon: b. Newburgh, N. Y., 17 Oct. 1851. He was graduated at Cornell University in 1873, at Jefferson Medical College in 1876 and at University Medical College, New York, in 1877. He was resident surgeon in the New York State Emigrant Hospital in 1877–79; superintendent of the State Emigrant Insane Asylum in 1879–81 and chief of staff at Blackwell's Island in 1881–85. He made a tour of the world and special study of the contagious diseases of the Orient in 1886. He was surgeon with rank of major in the American War with Spain; served with the Second Imperial army of Japan in Manchuria in 1905, and was special correspondent of the *Independent* in the European War. Author of 'The Real Triumph of Japan' (1906); 'Triumphs of Medical Science in Peace and War in Foreign Lands' (1908); 'The Tse-Tse Fly and Sleeping Sickness' (1908); 'Fair Play for the Republic of China' (1912); 'The Aftermath of the Balkan War' (1914); 'Crucifixion of Belgium' (1916), etc.

SEAMAN, sē'man, **Owen,** English writer: b. 18 Sept. 1861. He was educated at Clare College, Cambridge, in 1888 became lecturer in literature at the Durham College of Science (Newcastle-on-Tyne), and in 1890 was there appointed to the newly-established professorship of literature. In 1897 he was admitted barrister of the Inner Temple. He began contributions in 1894 to the *National Observer,* in 1895 to the *World* and in 1894 to *Punch,* whose staff he joined in 1897, and of which he became editor in 1906. Among his books of verse are 'With Double Pipe' (1888); 'Horace at Cambridge' (1894); 'Tillers of the Sand' (1895); 'The Battle of the Bays' (1896); 'In Cap and Bells' (1899); 'Borrowed Plumes' (1902); 'A Harvest of Chaff' (1904); 'Salvage' (1908), and 'War Time Verses' (1915).

SEAMAN, a person below the rank of officer who is employed in the navigation of a vessel either coastwise or on the high seas. The word «sailor» is broader in meaning than that of seaman, including men employed on inland waters as well as at sea, and in the United States, with a vast area of navigable lakes, sailor is the term more generally used. Seamanship is, of course, as old as navigation, and that originated before the historic period. Although in ancient times vessels were propelled to a great extent by the labor of slaves, chained to the oars they handled, the men engaged in navigating ships were usually free, and the ancient seamen appear to have had more voice in matters affecting the voyage than seamen have to-day. Commerce by water was the chief source of the wealth which made Tyre and Carthage, and some of the Greek cities in Asia and Europe rich and powerful, and skilful seamen were, therefore, in great demand. Similar conditions prevailed in the more prosperous republics of the Middle Ages and the Northmen who spread their sails in search of lands they could plunder and subdue were sailors and warriors both.

The discovery of America gave a great impulse to seamanship and may be said to have created a new race of sailors, who were also adventurers and whose feats of navigation have never been surpassed for daring, skill and achievement. In the early days of the American colonies and indeed up to the time when manufactures attracted the surplus population of the rural districts, Americans might almost have been called a race of sailors. They sailed around the world in their merchant ships, fighting French privateers and, when nearer home, dodging English revenue cutters, and in this school of varied hardship and adventure they learned the lessons of seamanship as no others had learned it before. Good sailing ability to navigate a ship to the best advantage was almost as requisite as good gunnery in the naval battles of a century ago, and America's splendid naval record of 1800 to 1815, in combat with French, Barbary pirates and British proves that American seamen could both navigate and fight.

The seamen in vessels trading in American ports for years have been mostly of foreign origin. Scandinavia supplies a large proportion of them and they are excellent sailors. Strict laws are on the statute books regulating the engagement and treatment of seamen, their claims to pay and their discharge and return to this country, if abroad. Seamen can no longer be beaten and cuffed with impunity by brutal shipmasters. The authorities, both civil and criminal, are quick to uphold the cause of a seaman who has a real grievance. Merchant seamen make their contract by signing a written agreement called the shipping articles. This must set forth the voyage, the ports at each end and all other matters which are necessary

to an intelligent understanding of the contract. The contract, when signed, is not absolute evidence of agreement on the part of the seaman, who may prove, if he can, that he was induced to sign by fraudulent representations, or while irresponsible. The law provides penalties for violation of the contract by either party; the amount and quality of provisions while on a voyage are regulated by statute, and the master is bound to pay the wages due, unless he can show that the seaman has been insubordinate or inefficient. A seaman refusing, without good cause, such as illness or other disability, to do the work assigned to him may be put in irons while on board and prosecuted in the nearest United States court. If he deserts he may be arrested and punished by forfeiture of wages and imprisonment. He can justify desertion by proof of cruel treatment. If a seaman is discharged without cause and against his will in a foreign port the master can be punished by six months' imprisonment or a fine of $500. If the seaman, who has done his duty, is willing to be discharged abroad, and the master on his part is willing to let the man go, the master must pay him three months' wages beyond what is due, one-third of which amount goes to a fund for the maintenance of American seamen abroad and for bringing them home. It is part of the duty of American consuls to be vigilant in the protection of American seamen, and the master of a vessel must present his papers for examination by the American consul or consular agent in all ports visited and must explain the reasons for the absence of anyone entered in the list of the crew.

Unfortunately many seamen are ignorant of the provisions of law intended to guard them from abuse and imposition, and the dissipation in which many of them indulge when on shore helps to make them easy victims of unscrupulous boarding-house-keepers and shipmasters, who conspire to rob them of advance money and virtually kidnap them on board vessels on which they had no intention of sailing. This evil is undoubtedly winked at, in some instances, by corrupt officials, who presumably receive a share of the proceeds. Some outrage, greater than usual, calls attention at intervals to the wrongs being perpetrated on seamen, and then there is a brief spasm of public anger and talk of prosecution and reform. This dies out, as a rule, without serious action having been taken and matters go on as before. The lot of the American seaman is, however, immeasurably better than it was in the early part of the 19th century, for now the law is on his side, when invoked, whereas formerly all its power was exerted on the side of the shipmaster, however cruel and unscrupulous.

In England also the seaman has had ample legal protection for over half a century, since the passage of the Mercantile Marine Act of 1850, which lays down minute rules for the government of both masters and seamen. The provisions of the act are very similar to the American laws bearing on the same subject.

The decline of the American merchant marine is attributed largely to the fact that, as a sop to American labor unions, laws were passed obliging vessels carrying the American flag to comply with certain regulations tending to increase the pay of the seamen. Because vessel-owners could hire seamen in foreign ports cheaper than in the United States they have chosen almost universally to fly a foreign flag. The World War, with the indiscriminate sinking of neutral craft by German submarines, stimulated the United States government to inaugurate a heavy shipbuilding era, and the consequent demand for American seamen has resulted in increased pay and better conditions.

In 1915 the Congress passed a new seamen's act providing improved conditions as to hours, food, sleep, pay, living quarters and terms of service. One clause called for 75 per cent of the crew to be able to understand orders in English. Penalties for desertion were removed and one-half the wages due were made payable on demand at any port; assignments of wages were voided. On the other hand, the seamen can be dismissed for cause, even in a foreign port, by taking certain action before a United States consul, but to deliberately abandon a seaman in a foreign port is punishable criminally. Seamen's quarters are prescribed to be not less than 16 square feet of deck and 120 cubic feet of air space per individual; washing and toilet arrangements are ordered and medical care and attendance.

SEARCH, Right of, so far as it applies to the homes, persons, papers and effects of American citizens, is regulated by the Fourth Amendment to the Constitution of the United States, which provides that the right of the people to be secure against unreasonable searches and seizures shall not be violated. This provision appears also in State constitutions. A magistrate should issue a search warrant only on evidence sufficient for a reasonable presumption that stolen articles, or articles used in violation of law, such as gambling implements, are to be obtained by the search, or that evidence essential to a prosecution for serious crime may thus be secured. An officer holding a warrant for the arrest of a person charged with crime may enter upon any premises where he believes that person to be, but is responsible both civilly and criminally for abuse of his authority. If an officer makes an arrest without lawful authority he is liable for false imprisonment. Persons not charged with crime may be arrested and detained as witnesses.

The extent of the right of search by belligerents of the vessels of neutrals is a much disputed question, and although it has been agitated for over a century it is far from a comprehensive and satisfactory decision. The assertion by Great Britain, during the wars with Napoleon, of the right to search American vessels on the high seas for alleged deserters from the British navy — some of whom were hanged after being taken from an American man-of-war — provoked the War of 1812. When peace was made, although other points in dispute were adjusted, this question was left unsettled, England, at that time, making no further attempt to interfere with American vessels, and the fall of Napoleon removing the causes which had led to England's high-handed measures.

The Declaration of Paris, signed by the plenipotentiaries of France, Russia, Great Britain, Austria, Prussia, Turkey and Sardinia, 16 April 1856, sought to settle the various questions relating to the right of search, declared

privateering abolished, that the neutral flag covered enemy's goods, except contraband of war, that neutral goods, except contraband of war, were not liable to seizure, even under the enemy's flag, and that blockades, to be binding, must be effective. The United States did not assent to this declaration, and matters were in this condition when the American Civil War broke out.

In 1861 a collision between the United States and Great Britain was nearly caused by the unauthorized action of the commander of a Union war-vessel, who stopped the British mail steamer *Trent* on the high seas and took from the *Trent* as prisoners Messrs. Slidell and Mason, commissioners of the Confederate States proceeding to Europe. England made preparations for war, but the government at Washington disavowed the stoppage of the *Trent* and released the commissioners. No privateers were chartered by the United States either during the Civil War or the Spanish-American War. In the latter conflict the United States and Spain proclaimed their intention to adhere to the principles of the Declaration of Paris, and this determination was adhered to throughout the war.

The right to search a neutral vessel for contraband of war is universally admitted, this right, however, being confined to private merchant vesssels and not applying to ships of war. The exercise of this right must be conducted with due care and regard to the rights and safety of vessels. All civilized powers also exercise the right of stopping and searching and, if cause be found, seizing or destroying, should resistance be shown, a vessel suspected of piracy or slave-trading. The right of search came into prominence again in 1914, 1915 and 1916, when Great Britain went to the limit in stopping neutral vessels in nearby waters and taking them to British ports. The action was violently opposed by many American shippers and was the subject of considerable diplomatic correspondence between the United States and British governments. Owing to the fact that American sympathies were mainly pro-British and that the United States later joined the Allies in the Great War, the entire question was dropped, and the conditions of right of search remain more indefinite than ever. See BLOCKADE; CONTRABAND OF WAR; PARIS, DECLARATION OF.

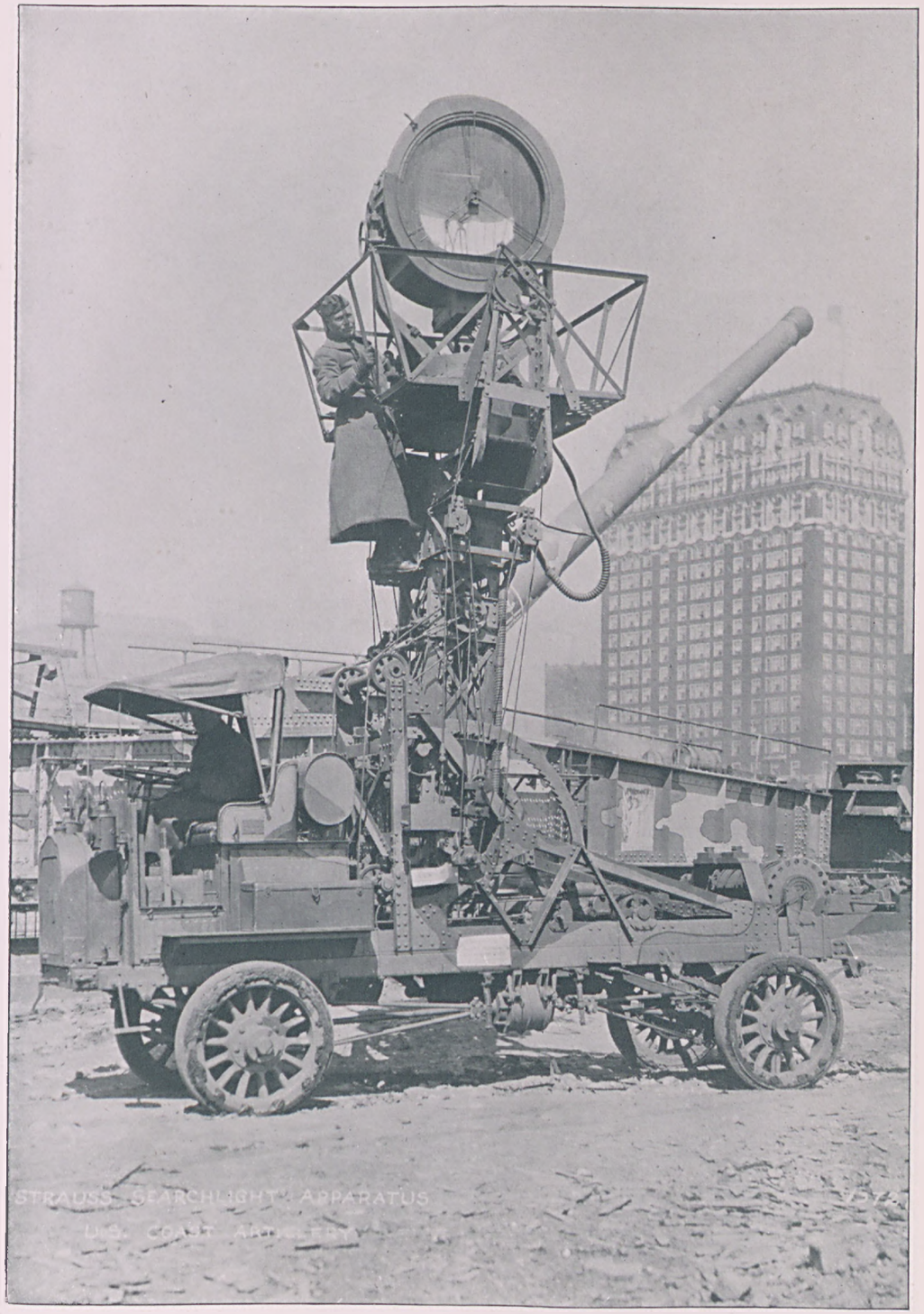
SEARCH WARRANT is a warrant requiring the officer to whom it is addressed to search a house or other place therein specified for property therein alleged to have been stolen, and if the same shall be found upon such search, to bring the goods so found, together with the person occupying the same, who is named, before the justice or other officer granting the warrant, or some other justice of the peace or other lawfully authorized officer. It should be given under the hand and seal of the justice and dated. The right is now extended to the search for other articles the possession of which is forbidden by law. The Constitution of the United States declares that "the right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated; and no warrants shall issue, but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and the person or things to be seized."

SEARCHLIGHT, a light-projecting apparatus by which electric-light rays are concentrated and reflected practically parallel in a beam to a great distance thereby disclosing to view at night objects far off. The source of introduction of the searchlight was the lighthouse, where metallic parabolic mirrors have been in use for many years. The rapid dulling of the metal surface led to using silvered glass reflectors, but the parabolic form in glass was not attainable for a long time, hence spherical surfaces were in use of necessity. This, however, made focal arrangement at angles necessary to diminish deviation of the reflected light from parallelism. Fresnel's investigations produced fine results along the line of knowledge, such as that the rays transmitted from a convex glass lens are in a nearly parallel beam *so long as the diameter of the lens is small compared to its focal length*, and but a small proportion of the light coming from the source is available. Fresnel's lenses were constructed of concentric rings and, surrounding the lens, totally reflecting prisms directed the light rays falling outside the prisms into the direction of the lens. For searchlights far better results arose from the outcome of the researches of Mangin who avoided all spherical aberration of reflection from a spherical mirror by using a concavo-convex lens bringing the light rays from the glass into the air almost free of deviation from parallelism, the divergence being practically negligible providing the diameter of the mirror is no greater than its focal length. In practice Sautter, Lemonier and Company constructed an apparatus on these principles in 1876, though the mirror reflected (by its effective angle of about 60 degrees) but a small part of the light from the source. The Sautter-Harlé firm has made great improvements since. Schuckert of Nuremberg, in 1886, produced parabolic mirrors from a single piece of glass using a process patented by him and Munker, and they excelled all others for searchlight purposes. The significant rule is that the intensity of a searchlight is *directly proportional to the area of the mirror and to the intrinsic brilliancy of the source of light.* The advantage claimed for the Mangin mirror is that though the zone illuminated has a smaller diameter than the parabolic, the illumination is greater.

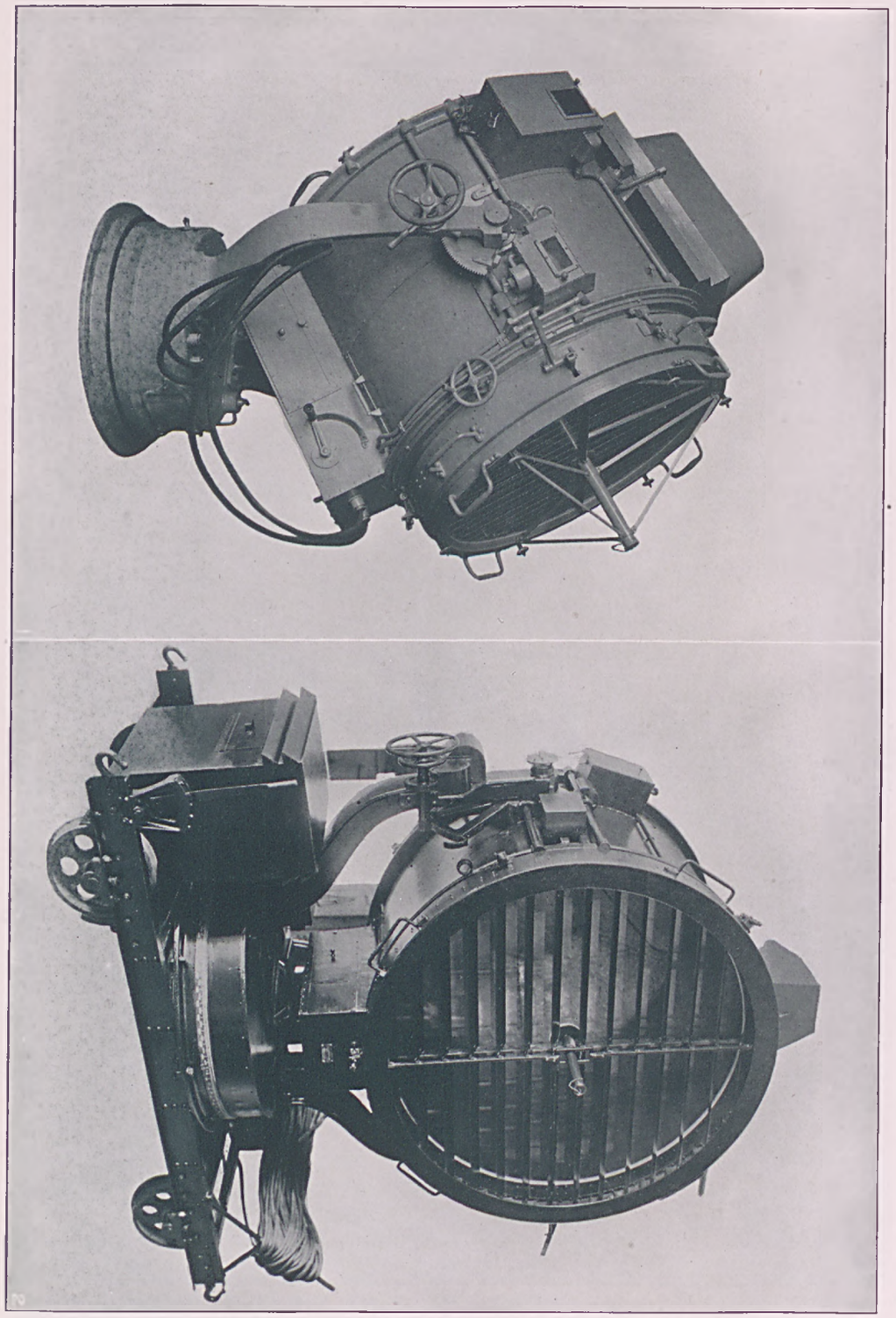
The uses to which searchlights are applied have been chiefly of a military or naval character, and are specially constructed for such purpose as field activities; on land fortifications; at naval stations and in coast defense; on battleships, etc. With the successful practice of aerial navigation the searchlight became a necessary weapon of defense in anti-aircraft service. The searchlight finds frequent useful work in the merchant marine in avoiding collision, during fog, also in the navigation of narrow or tortuous rivers.

In modern searchlights the usual essential features entering into their construction are (1) The body with its mirror, lamp and carbon-adjusting gear, and the front glass. (2) Turntable with arms carrying the trunnions that support the body and handgear for turning and tilting the body. (3) Base mounted on ball-bearings and supports for slip rings. In recent

SEARCHLIGHT



The projector is mounted on a turntable and is electrically operated so that it may be swung on both a horizontal and vertical axis, the movement being controlled from a distance of 500 feet. The arm is raised by a mechanism operated from a power take-off from the driving shaft of the chassis. It is provided with safety devices, controls, etc. It operates rapidly and throws a powerful light for a distance of many miles



1 Automatic Battleship Searchlight of the United States Navy. Drum diameter 36". Hand Control

2 Fortress Searchlight with Distant Electrical Control. Weight 10,000 lbs. Drum diameter 60". Track 1-meter gauge

Courtesy of The Sperry Gyroscope Company

years searchlights utilize the arc lamp as the source of light. In these the carbons are placed horizontally and within the principal focal axis of the mirror or reflector. The positive carbon is adjusted at the front end of the projector and the negative carbon, which is of smaller diameter, next to the mirror. The lighting power required, according to evidence of recent experts, would appear to be that emanating from the *incandescent crater* not the *luminous flux* caused by the flame or the incandescent point of the negative carbon (see ARC LIGHT). Searchlight arcs range from 25 and 30 amperes up to 200, or perhaps 250 amperes when used on fortification in coast defense work. Mirrors of recent use are of silvered glass or gilded metal. In military or naval usage the light beam is masked by a louvre mechanism or by flashing shutters which inhibit any passage of light. Searchlights are of two kinds actually, those with concentrated beam and those with dispersed beam. The latter is especially useful for illumination of water where mines are planted, etc.

Improvements in the essential features of the arc for searchlights during a number of years were not noteworthy, though changes in the measurements of the films have increased the available light rays slightly. The greater advance has been made in producing a more steady light, increasing the current per lamp. But the increased current enforces larger reflectors to obtain greater luminosity, the limit having practically been reached already. But the use of a cored carbon for the positive electrode invented (1910) by Heinrich Beck of Meiningen allows an increased brilliancy of the crater causing 300 per cent greater luminosity. The Elmer A. Sperry development of several years ago was also an advance somewhat on the Beck lines. In advancing the capabilities of the carriage and elevating mechanism for portable searchlights much inventive genius has also been expended. The Strauss portable searchlight apparatus type used in the United States Coast Artillery, as illustrated here, affords a good diagrammatic exposition of the land service searchlight and its equipment. This outfit makes its own power, travels at the rate of 15 miles an hour and carries a powerful 36-inch projector which can be raised 22 feet. In battle the projector can be controlled electrically by operators 500 feet away from the apparatus.

SEARCY, sär'sē, Ark., town and county-seat of White County, 50 miles northeast of Little Rock, on the Missouri and North Arkansas, the Rock Island and other railroads. It is the seat of Galloway Female College, contains a courthouse, city hall and Federal building and both public and high schools. It has three banking institutions and manufactories of staves, spokes and felloes, an oil mill and an ice plant. The value of its taxable property is about $1,000,000. Pop. 4,000.

SEARING, Laura Catherine Redden ("HOWARD GLYNDON"), American author: b. Somerset, Md., 9 Feb. 1840. At 10 she lost the power of hearing and of speech through illness, and was educated at the Missouri Institute for Deaf-Mutes. Later she largely regained the faculty of speech at Clark Institution, Northampton, Mass. She was married to Edward W. Searing in 1876. Her literary career began when she was 18, and during the Civil War she was a newspaper correspondent at Washington. In 1866–67 she was in Italy as correspondent for the New York *Times* and also engaged in literary work for the Department of Agriculture. During the Franco-Prussian War she wrote 'German War Gossip' for the New York *Tribune*, was on the staff of the New York *Mail* in 1868–76, and in 1886 removed to California, where she has continued writing for the leading periodicals. She has published 'Notable Men in the House of Representatives' (1864); 'Idyls of Battle' (1864); 'Sounds from Secret Chambers' (1874); 'El Dorado,' poems (1897); translations from French of 'A Little Boy's Story,' etc.

SEARLE, sêrl, **George Mary,** American clergyman: b. London, England, 27 June 1839; d. 7 July 1918. He came to the United States in 1840; was educated at Brookline High School and at Harvard University, being graduated at the latter institution in 1857. He was computer for the *Nautical Almanac* in 1857 and assistant at the Dudley Observatory, Albany, N. Y., in 1858–59. In 1859–62 he was engaged as computer in the United States Coast and Geodetic Survey and in 1862–64 was assistant professor of mathematics at the United States Naval Academy. In 1866–68 Mr. Searle was assistant at the Harvard Observatory. He entered the Paulist order in 1868 and was ordained in 1871. In 1895–97 he was professor of mathematics at the Catholic University, Washington, D. C.; in 1904–10 was superior-general of the Paulist Fathers; in 1910–11 was engaged in astronomical observations, particularly relative to Halley's Comet, at Newman Hall, University of California. In 1911–15 Father Searle was stationed at Saint Mary's Church, San Francisco, and after 1915 at the Apostolic Mission House, Brookland, Washington, D. C. He was a Fellow of the Association for the Advancement of Science and member of the American Academy of Arts and Sciences, the American Mathematical Society, etc. He published 'Elements of Geometry' (1877); 'Plain Facts for Fair Minds' (1895); 'How to Become a Catholic' (1905); 'The Truth about Christian Science' (1916), and contributions to periodicals.

SEARS, Barnas, American theologian and educator: b. Sandisfield, Mass., 19 Nov. 1802; d. Saratoga Springs, N. Y., 6 July 1880. He was graduated at Brown University in 1825 and later studied at Newton Theological Seminary. He was professor at Hamilton Literary and Theological Institute (now Colgate University) 1831–33, and afterward studied in Germany, where he assisted in establishing Baptist missions. He was professor and, later, president of Newton Theological Seminary; and in 1855–67 he was president of Brown University. He was general agent of the Peabody Educational Fund from 1867 until his death. For some years he edited the *Christian Review*. Author of 'The Life of Luther' (1850); and several textbooks and translations.

SEARS, Edmund Hamilton, American Unitarian clergyman and poet: b. Sandisfield, Mass., 1810; d. Weston, Mass., 14 Jan. 1876. He was graduated at Union College in 1834 and at Harvard Divinity School in 1837. He was

pastor at Wayland, Mass., in 1839–40; at Lancaster, Mass., in 1840–47; editor of the *Monthly Religious Magazine* in 1847–65; and after 1865 was pastor at Weston, Mass. Author of 'Regeneration' (1853); 'Pictures of the Olden Time' (1857); 'Christian Lyrics' (1860); 'The Fourth Gospel: the Heart of Christ' (1872), etc.

SEARS, sērz, **Isaac,** American patriot: b. Norwalk, Conn., 1729; d. Canton, China, 28 Oct. 1786. He descended from Richard Sears, who emigrated from Colchester, England, in 1630, and settled in Massachusetts. He was in command of a privateer against the French in 1758–61, and after losing his vessel settled in New York and engaged in the West Indian and European trade. He became a prominent member of the "Sons of Liberty," and was chairman of the first committee of correspondence established in New York. He commanded the troop that raided the printing establishment of James Rivington, editor of the *Royal Gazette.* After destroying the presses, the types were carried away to be cast into bullets. He was a member of the provincial congress in 1783, and also of the State assembly of New York. Having lost his fortune, he shipped as supercargo on a merchant vessel and contracted a fever on the voyage to China, from which he died.

SEARS, Joseph Hamblen, American author and publisher: b. Boston, 1865. He was graduated from Harvard in 1889, and has since published 'The Governments of the World Today' (1893); 'Fur and Feather Tales' (1897); 'None But the Brave' (1902); 'A Box of Matches' (1904).

SEARS, Lorenzo, American rhetorician: b. Searsville, Mass., 18 April 1838; d. 1 March 1916. He was graduated from Yale in 1861, from the General Theological Seminary, New York, in 1864, and was engaged in pastoral duties in New England in 1864–85. He was appointed to the chair of rhetoric and English literature at the University of Vermont in 1885, which he filled until 1890, when he occupied that of rhetoric and American literature at Brown University until 1906. He has published 'History of Oratory' (1896); 'The Occasional Address, Its Literature and Composition' (1897); 'Principles and Methods of Literary Criticism' (1898); 'American Literature in the Colonial and National Periods' (1902); 'Seven Natural Laws of Literary Composition' (1904); 'Makers of American Literature' (1904); 'Wendell Phillips, Orator and Agitator' (1909); 'John Hancock, the Picturesque Patriot' (1912); 'John Hay, Author and Statesman' (1914).

SEARS, Taber, American artist: b. Boston, Mass., 1870. He was educated at the Boston Museum of Fine Arts, School of Arts and at the Julien Academy, Paris, and studied under Jean Paul Laurens and Luc Olivier in Paris, as well as studying at Rome and Florence. He has specialized in mural paintings and in designs for stained glass windows. His mural paintings include 'The Spirit of Niagara' (Buffalo Historical Society); 'Among the Nations' (New York city hall); frieze of the Apostles (Epiphany Church, Pittsburgh), etc.

SEARSPORT, Me., town on Penobscot Bay, five miles northeast of Belfast, and about 30 miles southwest of Bangor. Its chief industries are shipbuilding, ice-gathering, shipping hay and lumber and poultry products. It has lumber and grist mills and a spool mill. It has a high school, graded elementary schools and the Sears Public Library, opened in 1872. The national bank has a capital of $50,000; the savings bank has a large amount of deposits. Pop. 1,444.

SEAS, Freedom of, a term of international law and diplomacy employed to describe the legal nature of the high seas, in respect to the right of every nation to navigate their waters freely beyond a certain limit, usually three miles from the coast, without being subject to the control of any nation. This freedom, now so well established, was not universally recognized in earlier times. As late as the 15th century Portugal asserted sovereignty over the Indian Ocean, and a large part of the Atlantic Ocean south of Morocco, while Spain asserted an equal right over the Pacific and the Gulf of Mexico, and the Pope supported their claims. In later times Great Britain asserted extravagant claims over the English Channel and certain great arms of the sea which washed the shores of the British Isles. Still later other nations, from time to time, asserted more or less jurisdiction over certain waters of the open seas. Thus the United States recently undertook to exclude other nations from killing fur seals in the Bering Sea many hundreds of miles from the American coast, but the question having been submitted to an international tribunal of arbitration, the tribunal decided against the American claims. Even now some nations claim and exercise jurisdiction in respect to fisheries and revenues over their littorals extending far beyond the three-mile limit, and although this assertion has occasionally produced irritation and conflict it has usually been acquiesced in. Formerly also certain nations claimed and exercised the right to control great bodies of the open sea connected by straits within their jurisdiction. The claims asserted by Denmark over the Baltic Sea were a well-known instance, and her claims were not finally abandoned until the middle of the 19th century. Grotius in his 'Mare Liberum' published in 1609 in answer to Selden's attack upon the freedom of the seas revived the doctrine of the Roman law that there could be no property in anything which could not be effectually occupied; hence the oceans were free to the navigation of all, subject to the control of no nation. Since Grotius' time the general principle of the freedom of the seas in time of peace has been universally recognized and except for the depredations of pirates and slave traders it has been generally enjoyed for purposes of navigation. This, of course, does not mean that a nation cannot restrict the maritime trade between its own continental ports or between itself and its colonies to its own citizens and to vessels flying its own flag, or that it cannot prescribe conditions under which foreign ships may enter or depart from its own ports. What freedom of the seas in time of peace means is the right of the ships of all nations to navigate freely the high seas outside the territorial waters and beyond the three-mile marginal sea without being subject to the right of search or molestation by the vessels or authorities of any nation.

In time of war no such freedom of navigation is recognized. This freedom is limited by the admitted right of belligerents to intercept and confiscate articles of contraband on their way to the enemy and to prevent by means of lawful blockade all intercourse or trade in any and all goods, whether contraband or not, with the enemy. To this end, the public vessels of a belligerent may stop and search on the high seas any neutral vessel with a view to ascertaining its nationality as well as the character and destination of its cargo and, under certain conditions, both may be confiscated or even destroyed. During the late war certain belligerents, notably Great Britain, went to the length of taking neutral vessels into distant ports for the purpose of conducting the searches, against all of which neutral governments vigorously protested. Mails from neutral steamers were likewise taken in, searched, censored and detained. Many neutral vessels were also stopped and persons of enemy nationality were taken off and imprisoned. Mines were sown in the open seas, first by Germany and then by Great Britain, and a goodly number of neutral merchant vessels innocently navigating the high seas were destroyed. Germany, and to a less extent Great Britain, also declared great areas of the open seas to be war zones, "barred zones," "danger areas" and the like (see WAR ZONES). The zones proclaimed by Great Britain could only be navigated with great danger and the Germans even went to the length of deliberately sinking all ships which entered the zones proclaimed by their government. In the enforcement of their blockade measures Great Britain and France applied the doctrine of continuous voyage or ultimate destination to trade with the enemy through neutral ports and thus effectually, it was charged, blockaded neutral ports. The doctrine of contraband was extended to include nearly everything that could be carried by sea, the distinction between conditional and absolute contraband was abolished and the rule of ultimate destination was applied to both classes of contraband without distinction (see CONTRABAND). The German government went even further and systematically sunk many hundreds of neutral vessels, including even fishing vessels, hospital ships and those engaged in missions of mercy and philanthropy, in spite of the immunity which international law assures them. By these and other acts the principle of the freedom of the seas, as it has been heretofore understood, was seriously infringed upon and loud protests were made by neutrals. The German government likewise never ceased to denounce the conduct of Great Britain and maintained that it was fighting for the freedom of the seas — a profession which in virtue of its own lawless conduct was more hypocritical than sincere.

While the United States was still a neutral the President denounced these infringements upon the freedom of the seas, and in an address to the Senate declared that the "paths of the sea must alike in law and in fact be free" and that "the freedom of the sea is the *sine qua non* of peace, equality and co-operation." As one of the 14 conditions of peace which he announced to Congress on 8 Jan. 1918 was the following: "Absolute freedom of navigation upon the seas, outside territorial waters, alike in peace and in war, except as the seas may be closed in whole or in part by international action for the enforcement of international covenants." It was pointed out at the time that the seas were already free in time of peace and his proposal must, therefore, apply only to the freedom of the seas in time of war. There was a difference of opinion as to the exact meaning of the proposal for "absolute" freedom of navigation and it was the subject of much discussion. Literally interpreted it would mean the abolition of the belligerent right of blockade, at least of commercial blockade, the right to seize contraband of war going to the enemy, the surrender of the right to prevent unneutral service and perhaps of the right to capture enemy private property at sea and to destroy enemy merchant vessels. Great Britain and France in their replies to the President's proposals accordingly stated that since the point relating to the freedom of the seas was "open to various interpretations," some of which they could not accept, they must, therefore, "reserve to themselves complete freedom on the subject when they enter the peace conference." It is obvious that a freedom of the seas which would deprive a belligerent of these weapons would amount in effect to a prohibition of naval warfare altogether and would place a naval power in a position of great disadvantage in comparison with a military power. It is well known that the exercise of these rights contributed more than anything else to the defeat of the Confederacy during the Civil War and it is doubtful whether without them the Allies could have forced Germany into submission during the late war. There seems little likelihood, therefore, that the great naval powers, including the United States, will be willing to pay such a price for an absolute freedom of the seas. Much may be said and has been said in favor of the immunity of private property from capture at sea and even in favor of the abolition of purely commercial blockades. The British government even went to the length of proposing at the second Hague Conference that contraband be entirely abolished and that neutrals be allowed to carry without molestation what they will to belligerents, and this proposal received the support of 26 states. But as yet no agreement has been reached and it does not seem likely that as to some of the proposals any agreement will be reached in the near future. As the term is now understood, therefore, freedom of the seas in time of war means nothing more than the liberty of neutrals to trade with belligerents subject to the long-established restrictions in respect to blockade and contraband. To be sure, these restrictions should be more precisely defined and limited so as to prevent in the future such grave infringements as were committed upon the rights of neutrals during the late war. As to the rights of belligerents to sow mines in the open seas beyond their territorial waters, to assert control over great areas of the sea under the name of "war

zones," and to destroy systematically and generally neutral merchant vessels, they should be forbidden altogether. These measures would not ensure "absolute" freedom of the seas but they would remove the most irritating sources of controversy, which is probably all that can be expected for the present. Consult Grotius, Hugo, 'Freedom of the Seas'; Ormond, S. W. T., 'The Law of the Sea'; Corbett, Sir Julian, 'The League of Peace and a Free Sea'; Woolsey, T. S., 'Freedom of the Land and Freedom of the Seas' (*Yale Law Journal,* Vol. XXVIII, p. 151); Hays, A. G., 'What is Meant by Freedom of the Seas' (*American Journal of International Law,* Vol. XII, p. 283); Anderson, C. P., 'Freedom of the Seas' (in *Annals of the American Academy of Political* and *Social Science,* July 1917).

JAMES W. GARNER,
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SEASHORE, Carl Emil, American psychologist: b. Mörlunda, Sweden, 28 Jan. 1866. He was graduated at Gustavus Adolphus College in 1891 and from Yale University in 1895. He was assistant in the Psychological Laboratory at Yale in 1895–97; and from 1897 was associated with the faculty at the University of Iowa, where he has been professor of psychology since 1902, head of the department of philosophy and psychology since 1905 and dean of the Graduate School since 1908. He invented many psychological instruments, among them being the voice tunoscope, spark chronoscope, pyscherogograph, audiometer, sound perimeter and multiple recorder. He is editor of the University of Iowa's *Studies in Psychology*; joint editor of the *Journal of Educational Psychology*; and consulting editor of the *Psychological Review.* Author of 'Elementary Experiments in Psychology' (1908); 'Psychology in Daily Life' (1913); 'The Psychology of Talent' (1917), etc.

SEASICKNESS, an affection attended with nausea and other disagreeable sensations produced by the motion of a vessel. Its causes and etiology are as yet imperfectly understood. Some refer it to causes dependent upon the altered or affected functions of the nervous centres; others to the regurgitation of bile into the stomach; and still others to irritation of the liver by the unusual movements of the body, increased secretion of bile being secondary. Probably each of these views contains something of the real explanation of the disorder.

When a landsman goes to sea, the movements of the ship, and the shifting lines and surfaces, unsettle his visual stability, as the different inclinations of the plank he stands on unsettle his muscular sense. The consequent derangement of these faculties reacts upon the nervous centres and through the latter upon the viscera, thus producing nausea and vomiting. Recollection of the disturbing sensations, together with the emotional state which they originally excited, may itself become an efficient cause, at least in individuals, of peculiarly irritable stomachs, or of highly sensitive nervous systems; for this plays downward upon the sensorial centres in such a manner as to excite in them the same condition as that which was originally produced through the medium of the sensory nerve. This may explain why certain individuals show all the symptoms of seasickness on going aboard a vessel perfectly at rest. So, no doubt, imagination is a potent and important factor in the case. The fact that visual impressions predispose travelers to seasickness suggests that a susceptible individual, when on deck, should shut the eyes.

But perhaps the chief causes of seasickness may be summed up thus: (1) Effusion of blood to the brain; (2) disturbance of the digestive system; (3) over-eating, and also under-eating. Many preventive measures referring to the construction and arrangement of vessels have been tried with little success; yet experiments with vessels having a swinging saloon, designed to preserve equilibrium in any sea, and vessels with a breadth intended to minimize the rocking motion, show that nautical men and shipbuilders are becoming alive to the interests and comfort of travelers. Preventive measures regarded from the patient's point of view are practically limited to the regulation of diet before a voyage. The diet for some days previously should be plentiful, but of light and nutritious character. Above all, the bowels should not be constipated and food should not be taken for at least five or six hours before going on board, although a cup of strong coffee just before embarking will prove beneficial as a slight stimulant. On the ship a position as near the centre as practicable is to be preferred. It is best when lying down to lie on the back, with the head and shoulders very slightly elevated. As a comforting measure during the attack of nausea and vomiting, some form of alcohol and ice in small doses has been recommended. A bandage moderately tight, across the pit of the stomach, or an ice-belt or even cold compresses all along the spine may afford relief; while some are benefited by sipping frequent drafts of lukewarm or cold water, though a glass of hot milk may be better. The presence of any harmless fluid in the stomach tends at least to prevent the disagreeable sensations of retching. Three or four drops of chloroform on lump-sugar may prevent vomiting and a suitable dose of bromide of soda and antipyrine will often give further relief. Many medical men consider that if drugs must be taken, the best all-around remedy is chlorobrom (not chloroform), a compound of chloralamide and bromide of potassium, while some prefer five grains of bromide of ammonia.

SEASONS, the four grand divisions of the year. Spring is from the vernal equinox, when the sun enters Aries, to the summer solstice; summer is from the summer solstice to the autumnal equinox; autumn is from the autumnal equinox to the winter solstice; winter is from the winter solstice to the vernal equinox. The earth's axis is inclined to the plane of the ecliptic at 66½ degrees, and as the earth moves round the sun in the course of a year, the northern hemisphere is turned to the sun in summer (most so at the summer solstice); at the equinoxes the line of light and shade on the earth passes through the poles, and at the winter solstice the northern hemisphere is turned from the sun. It is evident that the characters of the seasons are reversed to inhabitants of the southern hemisphere. See AUTUMN; EARTH; SUMMER; SPRING; WINTER, etc.

SEASONS, The, a poem in blank verse by James Thomson (q.v.), which has been characterized as "the classic of descriptive poetry." The evolution of the poem is traced in 'Winter,' published in 1726; 'Summer,' 1727; 'Spring,' 1728; and 'Autumn,' 1730. In 1744 the poet issued a new edition with extensive additions and alterations as 'The Seasons.' Departing from the severe classic style of Pope and his school, Thomson relied solely on an appeal to the external beauties of nature, and by simplicity and truthfulness inaugurated a new era in English poetry which gathered strength in Gray and Cowper and culminated in Wordsworth. Not only in England was he imitated by his contemporaries, notably by Goldsmith in 'The Deserted Village,' but numerous translations appeared on the continent of Europe, while in 'Les Saisons,' Saint-Lambert (1716–1803) copied Thomson in a poem praised by Voltaire, and which was popular for half a century.

SEATON, Sir John Colborne, 1st Baron of. See SIR JOHN COLBORNE.

SEATON, William Winston, American journalist: b. King, William County, Va., 11 Jan. 1785; d. Washington, D. C., 16 June 1866. He engaged in journalism at 18 and edited various newspapers until 1812 when he became associated with his brother-in-law, Joseph Sales, Jr., with whom he was editor and owner of the *National Intelligencer* at Washington. From 1860, until just prior to his death, he was sole editor and manager. In 1812–20 Seaton and Gales were exclusive Congressional reporters, one attending the sessions of each house. Their publications are highly authoritative and of great historical value. They include 'Annals of Congress, Debates and Proceedings of the Congress of the United States from 3 March 1798, till 27 May 1824' (42 vols., 1834–56); 'Register of Debates in Congress from 1824–37' (29 vols., 1827–37); 'American State Papers' (21 vols., 1832–34). Consult the 'Life' by his daughter (1871).

SEATTLE, Wash., largest city of Pacific Northwest, county-seat of King County, and a seaport important in coastwise, Alaska and Oriental trade, is situated between Puget Sound on the west and Lake Washington on the east; 865 miles by water north of San Francisco, Cal., 185 miles by rail north of Portland, Ore., 123 miles by rail south of Canadian boundary. The city area is 94.47 square miles, of which 35.91 square miles are water.

Location.— Seattle has a beautiful natural setting with the snow-capped Olympic Mountains and Puget Sound on the west, while on the east are Lake Washington and the Cascade peaks, including Mount Baker (10,730 feet) and Mount Rainier (14,408 feet). Lake Washington, 22 miles long, four miles wide, 225 feet maximum depth and a shore line of 80 miles, has been recently connected with Puget Sound by a ship canal more than eight miles long, built by local and State appropriations. The canal, 150 feet wide and 36 feet depth of water, joins lake and sound through Lake Union, in the heart of the city, two miles long by three-quarters of a mile wide. The level of Lake Washington and Lake Union is the same, while one set of locks (cost to United States government, $2,275,000) connects the fresh waters of the latter with the salt waters of Puget Sound. These locks have one chamber 80 × 825 feet in dimensions and another 30 × 100 feet, with a depth of water from 36 to 42 feet. The larger chamber requires 25 minutes and the smaller 15 minutes to pass a ship through. The canal, opened in July 1916, has extended Seattle's waterfront area from 40 to 140 miles, adding a fresh water, non-tidal harbor, unique in the world. At the south end of Elliott Bay another artificial waterway has recently been completed by the straightening of the Duwamish River through local appropriations. The Duwamish waterway, five miles long, 300 feet wide and 30 feet deep at low tide, taps a level district rapidly coming to the front as a manufacturing section.

The general contour of Seattle is hilly, ranging from sea-level to 500 feet on the West Seattle crest. Queen Anne Hill, a prominent residence district, is 464 feet high. The valleys have a north and south trend and the prominent hills include Beacon Hill, First Hill, Renton Hill, Capitol Hill, Queen Anne Hill and Madrona Hill. Cable lines running east and west serve the higher hills direct, while the electric lines follow winding routes to the various parts of the city. Regrading in recent years has torn down some of the hills which obstructed business and has filled in the hollows creating a level area. More than 34,000,000 cubic yards of earth have been removed, largely by the hydraulic process, and hills 130 feet high have been leveled. While business houses occupy the lower, level areas, the general residence districts are on the slopes possessing perfect drainage and a wealth of sunshine, fresh air and scenery. In addition to Lake Union and Lake Washington there is in the north central part of the city adjoining Woodland Park, a small lake about a mile long and half a mile wide. The waters of these lakes are clear and pure and do not freeze as the average winter climate in Seattle is 40° above zero.

Climate.— The equable temperature of the Puget Sound region, ranging from 40° to 64° (the high summer average) is due to the effect of the Japan current and has much to do with Seattle being the healthiest city in the world. The death rate in 1918 was 6.80 per 1,000. The city has the best of water, sewers, pavements and sidewalks. Seattle has no extremes of heat, cold, floods, nor drought (annual rainfall, 29.2 inches). There are 622 miles of watermains; 495 miles of sewers; 282 miles of paved streets.

Banks.— There are 31 banks with deposits aggregating about $170,000,000 and clearances of about $2,000,000,000.

Communications.— The terminus of several transcontinental railroads, Seattle is reached by the Great Northern, Northern Pacific, Chicago, Milwaukee and Saint Paul and Union Pacific (Oregon–Washington) railroad companies over their own rails, while through transcontinental trains are operated by the Canadian Pacific (over Northern Pacific tracks), the Chicago, Burlington and Quincy (over Northern Pacific tracks), and the Southern Pacific (over Oregon–Washington tracks). There is a short line local railroad — the Columbia and Puget Sound. The Grand Trunk Pacific and Canadian Pacific operate their steamships from Canadian

terminals at Prince Rupert, British Columbia, and Vancouver, British Columbia, respectively, to the Grand Trunk and Central Pacific railroad docks in Seattle. The several important steamship lines having their headquarters in Seattle give the most frequent service to Alaska of any Pacific Coast port, thus supplementing Seattle's geographical position as the natural trade gateway to the North country. The Alaska Railroad Commission, building a government line from Seward to Fairbanks, has its office in Seattle. Practically all the gold from Alaska and the Yukon Territory is received here and the United States Assay Office established in 1898 has since received about $265,000,000 worth of gold. Among the leading Alaska steamship lines operating freight and passenger vessels from Seattle are the Alaska Steamship Company, the Pacific Alaska Navigation Company, the Pacific Coast Steamship Company, the Humboldt Steamship Company, the Northland Steamship Company, the Border Line Transportation Company, the Westward Navigation Company, the Canadian Pacific and Grand Trunk Pacific. Many of these companies also operate coastwise to California ports and utilize the Panama Canal to reach Atlantic Coast ports. Being 1,250 miles nearer Oriental ports by the Great Circle Route than by any of the steamship lines operating from California, Seattle is naturally an important figure in the Far Eastern trade. Great liners operate from this city to Japan, China, Siberia, Hawaii, the Philippines, Straits Settlements, Australia, Mexico, South America, Europe, and, in fact, to every part of the world. Seattle is both the commercial and industrial centre of the Puget Sound Customs District, which leads every other district on the Coast in value of imports and exports. In 1918 the net tonnage of vessels entering Elliott Bay, Seattle's Harbor, was 20,418,247 tons. The foreign exports in 1918 (harbormaster's report) totaled $212,501,489; foreign imports, $368,306,395. Seattle has a large fleet of steamers owned locally and operating to ports on Puget Sound and adjacent waters. A fleet of steamers operates with freight and passengers on Lake Washington. The total water-borne commerce of Seattle in 1918 (including foreign, coastwise and local) was valued at $792,120,736. Leading articles of export included wheat, flour, lumber, fish, coal (from mines in vicinity of Seattle), hay, fruit, livestock, dairy products and general merchandize, a large part of which is produced in the vicinity of Seattle or in Washington. The leading imports were silk, rice, tea, coffee, sugar, spices, indigo, curios and Oriental products of various kinds.

Public Buildings.— Seattle has more than 300 churches, including Chinese, Japanese, Finnish, Jewish, Scandinavian, German and Russian, and is the See of the Roman Catholic bishropic of Seattle (formerly Nesqually). Among the attractive religious edifices are Saint James Cathedral, First Baptist Church, First Church of Christ Scientist and First Presbyterian Church, the last-named seating 3,000 in the main auditorium. Among the other buildings worthy of note are the following: 42-story L. C. Smith Building (highest office building outside of New York City), the cost of which was $1,500,000; Metropolitan Building (White-Henry-Stuart), cost $1,500,000; Providence Hospital, cost $1,000,000; Washington Hotel, cost $970,000 (with ground and furnishings, $1,500,000); Hoge Building, $700,000; Alaska Building, $700,000; Cobb Building, $600,000; City and County Building; Carnegie Library, Oregon-Washington and Union depots, Arctic Club, Sunset Club and Rainier Club. Among the leading theatre buildings are the Metropolitan, Moore, Pantages and Orpheum.

Industrial Activities.— The cheap water and hydro-electric power obtainable in Seattle have aided in making it the most important manufacturing, as well as commercial city of the Pacific Northwest. The municipal electric plant represents an investment of $6,660,000. Seattle is said to be among the best lighted cities in the world. Private power in large quantities is also sold at rates from one-half cent per kilowatt hour up by the Puget Sound Traction, Light and Power Company. A recent industrial census showed 1,811 industries in Seattle, an increase of 588 plants over 1909, or a percentage of 57.4. Among the important industries are the following: flour, $15,000,000; lumber products of the State of Washington, $120,000,000; canned salmon and preserved fish handled at Seattle, $80,000,000. The shipbuilding industry is also of great and increasing magnitude in Seattle.

Parks, Recreation Centres, etc.— The parks and boulevards are unusually complete for a city of the age and size of Seattle. There are 1,815 acres under the jurisdiction of the park commissioners, including 44 improved parks and 24 equipped and supervised playgrounds. Connecting the thickly forested parks in the various parts of the city by winding drives with easy gradients, now skirting the Lake Washington shore or overlooking the waters of Puget Sound and the mountains, the scenic boulevard system of 31 miles within the city limits is one of the most attractive in the United States. It will be 50 miles long when fully completed, practically encircling the city and touching all the more sightly elevations. The sum of $5,089,606 has been spent on park extensions and improvements. These figures include the pavilion and bathing facilities at the municipal beach at Alki Point and the municipal golf links at Jefferson Park. Other improved parks include Seward (198 acres) on Lake Washington; Woodland (179 acres) adjoining Green Lake in the north part of the city and embracing the zoological department, athletic field, recreation and picnic grounds, boating, bathing, fishing and concert facilities; Ravenna Park, including Sulphur and Mineral Springs, immense trees, water falls and natural ravine; Washington Park, a large tract of natural wood bordering Union Bay of Lake Washington, and containing city speedway; Volunteer Park on Capitol Hill overlooking both Lake Washington and Puget Sound has statue of William Henry Seward by Richard Brooks, Municipal Conservatory filled with exquisite blooms the year 'round, formal gardens, concert facilities, and a public observatory 460 feet above sea-level; Alaska-Pacific-Yukon Exposition Grounds on University of Washington Campus containing formal gardens; Schmitz

SEATTLE, WASHINGTON



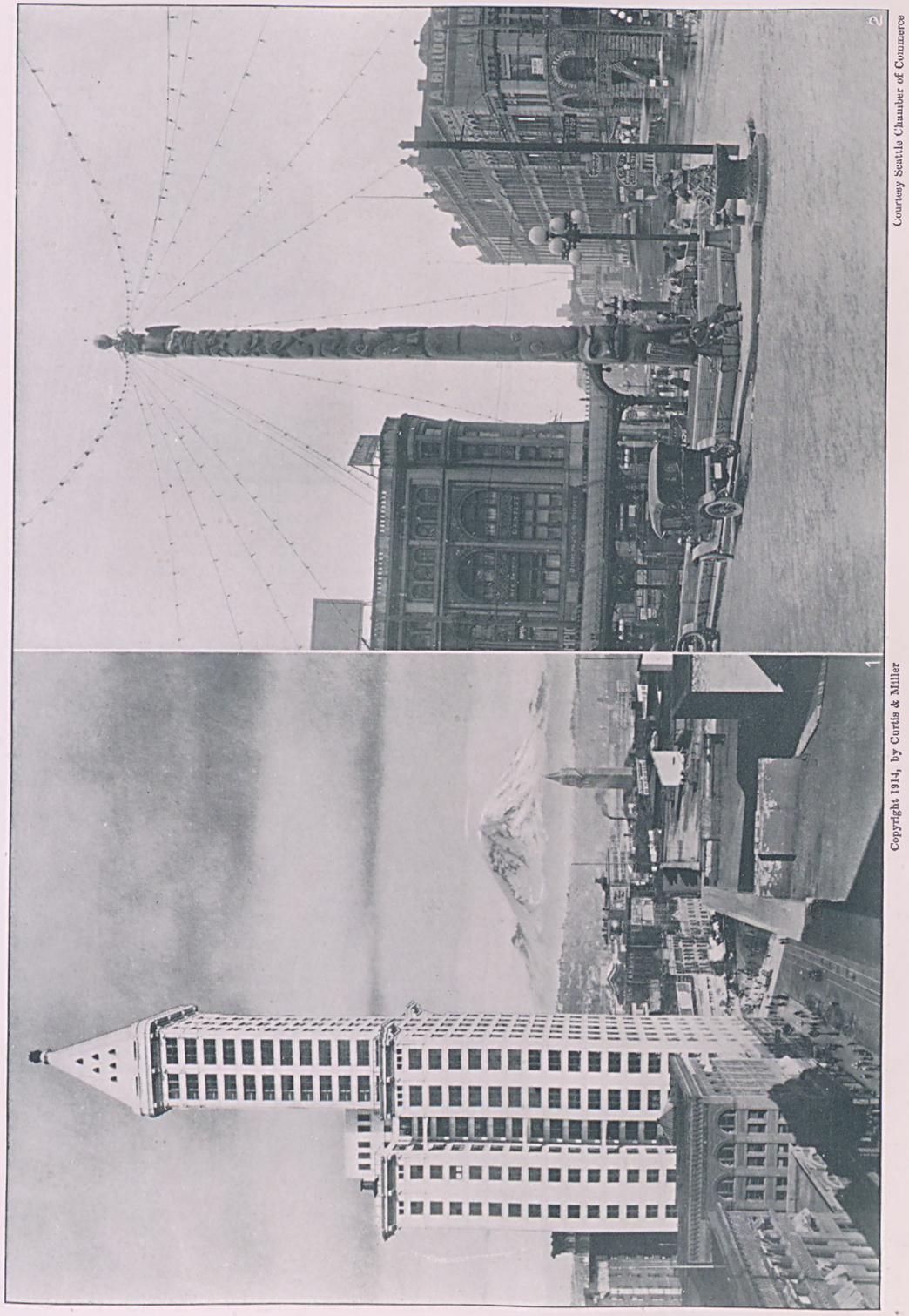
Business section of Seattle with Olympic Mountains across Puget Sound

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Courtesy Seattle Chamber of Commerce

1 Seattle Waterfront 2 North Business District, Olympic Mountains in distance 3 Volunteer Park, formal gardens



Courtesy Seattle Chamber of Commerce

Totem Pole in Pioneer Square

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Forty-two story skyscraper, Mount Rainier in the distance

Park, a beautiful natural park on West Seattle Peninsula with ravines, lakes and big trees; Kinnear Park on Queen Anne Hill with formal improvements and marine view; Madrona Park on Madrona Hill overlooking Lake Washington and Mount Rainier, with winding walks, pagodas, swings and tennis courts; Denny Blaine, Mount Baker, Leschi and Atlantic, smaller lakeside parks surrounded by home districts; Frink, Cowan, Denny and Salmon Bay parks in the midst of residences. Among the leading playgrounds are Lincoln, Walla Walla, Collins, Beacon, Rogers, South Park, Day, Columbia, Miller, Rainier Beach, Ballard, University, West Seattle, Alki, Queen Anne, Mercer and Ross, all fully equipped with modern apparatus and many with adult instructors and supervisors. Wading pools and sand piles are provided in addition to tennis, baseball, cricket, football and other facilities. Elaborate field houses equipped with gymnasium apparatus, stages for amateur plays and recreation rooms have been erected at a total cost of $75,000 in the following playfields: Collins ($25,000); South Park ($20,000); Ballard ($15,000); West Seattle ($15,000). There are 20 equipped playfields and four additional playground sites are unimproved. Among the largest of several open spaces in the business district is Pioneer Place where the famous Totem Pole stands and where the park commissioners have constructed an underground public comfort station to accommodate 12,000 persons daily. Other stations are located at Pike Place market, Public Library, Sixth avenue and Westlake and similar popular portions of the business district. In addition to the municipal amusement places there are private amusement parks, including Luna Park and Golden Gardens, both located on Puget Sound; Fortuna and other parks on Lake Washington. The links of the Seattle Golf and Country Club are north of Seattle and of the Earlington Golf and Country Club north of the city.

The University of Washington has a golf links on its campus of 355 acres within the city limits.

Education.— The university (established here by legislature of 1854–55) is rapidly advancing to leadership on the Pacific Coast. It has 6,000 students, 310 professors and instructors with several permanent buildings of beauty valued at $1,200,000. On the campus is a statue of George Washington by Lorado Taft and a bust of James J. Hill by Finn Frolich. The Museum, Forestry Building and open air auditorium are of interest to strangers. The grounds of Fort Lawton (605 acres given by Seattle to the Federal government) are in the northwest part of the city overlooking Puget Sound. The navy yard, Puget Sound, located at Bremerton about 15 miles west by south of Seattle, is protected by Fort Ward and has one of the two largest dry docks in the United States navy,—863 feet long and 110 feet wide. It also has a dry dock 627 feet long and 39 feet deep. The yard is equipped at government expense for building battleships and as the result of its natural advantages promises to be one of the largest in the country.

The public schools of Seattle are of an excellent standard including six high schools, 72 grade schools, 50,000 pupils and 1,010 teachers. The high schools are of the latest type with gymnasium, domestic science and normal school equipment and cost as follows: Franklin (Mount Baker district), $426,000; Broadway, $425,000; Lincoln (Green Lake), $386,000; Ballard, $330,000; Queen Anne, $253,000; Jefferson (West Seattle), $250,000. In addition to the University of Washington, Seattle has the Washington Preparatory School for Girls, Academy of the Holy Name, College of Our Lady of Lourdes, Adelphia College, Seattle College, Brothers School for Boys, numerous business colleges, dramatic schools and conservatories. The Parental School for unruly children is located on Mercer Island in the southeastern part of Lake Washington.

Libraries.— The city library system has about 314,000 volumes in the Carnegie Library and nine branches with 70,167 borrowers, a circulation of 1,336,143, and buildings and grounds worth $1,100,000.

Public Monuments.—Among the statues in the business area in recognition of his services to the State and in making possible the Lake Washington Canal construction, as well as other community endeavors, is one of the late Governor John H. McGraw, by Richard Brooks, at Times square on Westlake avenue. Other works of art in Seattle include statues and paintings owned by the Washington State Art Association with exhibition galleries in the White Building, and including the following: Bronze statue, 'Diana and Endymion,' by Ernst Dame, standing in "Totem Gardens" at Fifth avenue and University street; bronze statue, 'Mercury in Repose,' duplicate of one taken from ruins of Herculaneum and now in National museum at Naples, Italy; portrait of Henry Yesler, a Seattle pioneer, by J. Carroll Beckwith, of New York; oil painting (9×9 feet), 'Jesus in the Tomb,' by Henry Levy; oil painting, 'Dorset, Vermont,' by the late Frederick Crane; oil paintings of Alaskan scenery, by Leonard Davis. The association owns the Tozier Collection of Indian Relics and Curios, the most complete record of the art of Alaskan Indians in existence. This includes baskets, implements used in hunting and daily life, ivories, and carved black jade, and remarkable totem carvings, some of the totem poles being on display in "Totem Gardens" at Fifth and University.

Charitable and Correctional Institutions.—A charities endorsement committee created (1903) is operated by the Seattle Chamber of Commerce and Commercial Club. There is a Charities Organization Society, a charities commission appointed by the county board of commissioners, a receiving home for children (1896) under the Washington Children's Home Society; Seattle Children's home (1884) under the Ladies' Relief Society of Washington; Children's Orthopedic Hospital (1907); Girls Home and Training School (1909) under the auspices of the Seattle Federation of Women's Clubs; Kenny Home for elderly men and women under the auspices of the Presbyterian Church; Seamen's Home under Seattle branch of American Seamen's Friend Society; Firland Anti-Tuberculosis Institution built and operated by the city; Anti-Tuberculosis League of King County (1909), treatment in homes and special hospitals; Florence Crittenden Home, branch of the National Crittenden Mission; Lebanon Rescue Home for fallen girls; Japanese Women's Home; Volun-

teers of America; Salvation Army; Young Men's Christian Association; Young Women's Christian Association; Red Cross Society, a branch of the National organization; Humane Society of Seattle; Seattle Fruit and Flower Mission; House of the Good Shepherd (Sisters of the Good Shepherd); Mount Carmel Mission and Columbus Sanitarium and (Missionary Sisters of the Sacred Heart); Catholic Social Betterment League; Ladies' Hebrew Benevolent Society; Ladies' Montefiore Aid Society; Hebrew Benevolent Association; Hebrew Immigration Aid Society; Seattle Day Nursery; John Walter Ackerson Home; and the Pacific Coast Rescue and Protective Association. The Seattle Foundation was recently organized as a clearing house for charities and beneficences. The principal hospitals are: Providence Hospital (1877), under the Sisters of Charity; Seattle General Hospital (1894); Wayside Emergency (1900); Minor Hospital; Swedish Hospital; Pacific Hospital; Municipal Hospital, under control of city; County Hospital, under control of county commissioners. The county has platted its former poor farm property in the city limits into industrial sites, having rail and salt water transportation, and is leasing them to new industries. The commissioners have bought a county farm of 407 acres at a cost of $113,000 to house the indigent.

Societies for Civic Betterment.—Among the civic organizations working for community advancement is the Seattle Chamber of Commerce and Commercial Club, the oldest organization of the kind in the city and now including industrial, publicity, conventions, taxation, transportations, foreign and domestic commerce, Alaska charities and exhibits bureaus. Other semi-public organizations include the Manufacturers Association, Merchants Exchange and Washington State Art Association, in addition to numerous business and educational bodies, technical and local improvement clubs. Leading social clubs include the Rainier, Arctic, University, College and Seattle Athletic organizations for men and the Sunset and Women's college clubs for women. Musical organizations include the Amphion Society, Symphony Orchestra, the Northwest Musical Festival Association, which gives a week's festival in July each year, and several conservatories and colleges of music. The Y. M. C. A. and Y. W. C. A. own their buildings.

Street Railways.— The street car lines purchased by the city from the Puget Sound Traction, Light and Power Company cover 260 miles, besides two municipally owned lines, one entirely in the city and the other operating partly within and outside the city limits. The Puget Sound Traction, Light and Power Company also operates interurban lines to Tacoma and Everett, while the Seattle, Renton and Southern operates an interurban line to Renton. The city of Seattle conducts its own garbage collection, disposing of same by incinerators and sanitary fills.

Public Markets.— The ferries are of special service to the farmers and ranchers in the vicinity of Puget Sound, enabling them to convey easily and economically their produce to the public markets for which Seattle is noted and which contribute to the low cost of living in this city. There are municipally or privately owned market places in various parts of the business districts where the growers, fishermen and other producers sell direct to the housewife, insuring fresh foods and low prices.

Other Features.— Seattle is the headquarters of the Immigration Service of the Pacific Northwest and the United States Detention Station is located here. Canadian immigration and customs officials are also established at this port. The centre of the Northwest good roads movement, Seattle is the terminus of the Savannah to Seattle Transcontinental Highway, on the Pacific Highway from Canada to Mexico, prominent on the National Parks Transcontinental Highway as the gateway to Rainier National Park, as well as the famous Sunset Highway through Snoqualmie Pass (3,010 feet) in the Cascade Mountains, and also on the Georgian Circuit which includes the Olympic Peninsula and British Columbia highways. The headquarters for the 13th Division of the United States Railway Mail Service are located here.

Water Supply.— Seattle's municipal water system is valued at $11,000,000 and has a daily capacity of 62,500,000 gallons with a daily consumption of about 33,000,000 gallons. There are 48,000 accounts on the department's books and 9,000 hydrants supplied by 704 miles of pipe line. The city's storage capacity is 271,137,000 gallons, conveyed by two pipe lines, aggregating 62.64 miles, from the watershed in the Cascade Mountains, 28 miles from Seattle. The rates are low and the water is cold, sparkling, and almost as soft and pure as distilled water.

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after the entire citizenship had wielded pick and shovel to build a line threatening to connect with the Canadian Pacific. Anti-Chinese riots in 1885 were quelled by a local vigilance committee. A disastrous fire in 1889 destroyed the business district causing a $7,000,000 loss. Pledges of contributions by Seattle to the Johnstown flood sufferers went forward in the face of the disaster. The indomitable Seattleites soon rebuilt better than before. The financial panic of 1893 retarded Seattle's growth but the first shipment of Alaska gold in 1897 gave new impetus to her forward movement, which has not since been halted. In 1909, from 1 June to 15 October, an exposition on the University of Washington Campus was attended by about 4,000,000 people and upon its close turned over to the university 19 buildings of various sizes for college purposes. To start construction of the exposition, representing an expenditure of $10,000,000, Seattle citizens subscribed in one day more than $600,000 in stock and the project was entirely financed by city and State without Federal assistance (except as an exhibition). The exposition was unique in being completely ready on the opening day and closing with all debts paid.

Population.—(1870) 1,107; (1880), 3,533; (1890) 42,837; (1900) 80,671; (1910) 237,194; (1920) 315,312. In 1910, more than one-quarter of this population (61,134) were of foreign or mixed parentage, including 9,850 English Canadians; 8,676 Swedes; 7,191 Norwegians; 6,172 Germans; 6,127 Japanese; 5,797 English; 3,176 Irish; 1,879 Danes; 1,298 Finns and 924 Chinese.

Bibliography.— Denny, 'Pioneer Days'; Bagely, 'History of Seattle, Washington'; Beaton, 'City That Made Itself'; Publicity Bureau, Seattle Chamber of Commerce, 'Picturesque Seattle and Puget Sound'; 'Seattle'; Port Commission, 'Port of Seattle Year Book 1914.'

H. W. Margeson,
Publicity Director, Chamber of Commerce.

SEAWEEDS, the simpler kinds of plants which grow in the water. The term is restricted to the lower plants, and does not include the aquatic kinds of mosses, liverworts, fernworts, and flowering plants. (See Algæ). Originally the term was applied exclusively to the plants which live in the seas and oceans, but these are now called "marine seaweeds" to distinguish them from the "fresh-water seaweeds" which grow in rivers, lakes, and ponds. The simplest of all plants, the blue-green slimes (*Cyanophyceæ*) are the lowest of the seaweeds. They occur mostly in fresh waters; some, however, are marine. The green seaweeds (*Chlorophyceæ*) are of considerably higher organization, the cells being distinctly nucleolated, and possessing well defined chromatophores, in which the green coloring matter resides. They include such single-celled types as the common green slimes (*Protococcus*), desmids, diatoms, the filamentous pondscums, green felts (*Vaucheria*), as well as some larger leaf-like and massive kinds (*Ulva, Caulerpa, Codium,* etc). They occur abundantly in both fresh and salt waters throughout the world.

The brown seaweeds (*Phæophyceæ*) are closely related to the green seaweeds, and differ from them mainly in having an additional brown coloring matter which hides the green color of the chromatophores. The simplest forms are minute few-celled plants, others are branching filaments, while still others are large, massive plants many feet in length, and composed of root, stem and leaves. In all the mode of reproduction is of a simple type, showing their low grade in spite of the great size of some of the species. Among the larger plants of this group are the kelps (*Macrocystis, Lessonia,* etc.), devil's aprons (*Laminaria*) and rockweeds (*Fucus*). Some Pacific species of the first-named genus attain a length of several hundred feet, and are doubtless the longest plants in the world. Nearly all brown seaweeds are marine, a few only living in fresh waters. The red seaweeds (*Rhodophyceæ*) are by far the most beautiful and interesting of aquatic plants. They are of a higher organization than those of the preceding groups. A few are composed of simple slender filaments, but they are more commonly multicellular stems, with roots below, and leaf-like or finely divided branches above. Although they are green plants, having well-developed chromatophores in their cells, they have in addition a reddish or purplish coloring matter which hides the green color. This often gives them a beautiful color, which, added to their delicate and regular branches, makes them exceedingly attractive objects of study. They are commonly collected by seaside visitors, under the name of "seamosses." A few species live in fresh waters, all the others being marine. Some species are edible, as notably the so-called "Irish moss" (*Chondrus crispus*), of the Atlantic Coast of America and Europe, from which is made the delicacy known as *blanc mange.* The highest of the seaweeds are the stoneworts (*Characeæ*), which resemble some of the red seaweeds, but are of a green color, the red coloring matter not being developed in them.

SEAWELL, sē'wĕl, **Molly Elliot,** American novelist and playwright: b. Gloucester County, Va., about 1868; d. Washington, D. C., 15 Nov. 1916. After the death of her father, a nephew of President Tyler, Miss Seawell and her mother removed to Washington, D. C., where she began writing stories and sketches in 1886. Her first signed story was 'Maid Marian,' which was subsequently dramatized. The next offering of Miss Seawell was 'Throckmorton' (1890). It met with success as did 'Children of Destiny,' which followed it in 1893. A prize of $500 offered by the *Youth's Companion* for a study of boys presented a new field for conquest. She won the prize over 3,000 competitors with 'Little Jarvis.' So great was the popularity of the story that it was made the first of a series entitled 'Young Heroes of Our Navy.' The succeeding volumes — 'Decatur and Somers,' 'Midshipman Paulding' and 'Paul Jones' were written by Miss Seawell, and maintained the success won by the first. In 1895 her 'Sprightly Romance of Marsac' won a prize of $3,000 offered by the New York *Herald* for the best novelette. In 1900 she dramatized the story. In 1908 she won another *Herald* prize for a short story with 'John Mainwaring, Financier.' Miss Seawell's other stories include 'Twelve Naval Captains'; 'The Rock of the Lion'; 'The Imprisoned Midshipman'; 'The Lost Duchess of Belgrade'; 'The Secret of Toni'; 'The House of Egremont'; 'Papa Bouchard'; 'Garvin Hamilton'; 'A

Strange, Sad Comedy'; 'The Victory'; 'The Chateau of Monplaisir'; 'The Marriage of Theodora'; 'A Virginia Cavalier'; 'The Jugglers'; 'The Lover of the Lady Arabella'; 'History of the Lady Betty Stair'; 'Francezka'; 'Fifi'; 'The Ladies' Battle,' and 'The Diary of a Beauty.' Miss Seawell was identified prominently with the anti-suffragist movement in Washington.

SEBACEOUS GLANDS, small structures of glandular nature and sacculated form which exist in the substance of the corium, or deep layer of the dermis or true skin. They are very generally distributed over the entire skin-surface, but are most numerous in the face and scalp. Those of the nose are of large size, and may frequently become enlarged from the accumulated secretion of the glands; while the largest in the body are the sebaceous glands of the eyelids, the Meibomian glands (see EYE). Around the orifices of the mouth and anus, nose and external ear, these glands are found in numerous array; but they appear to be absent from the skin of the palms of the hands and soles of the feet. Each sebaceous gland consists essentially of a lobulated or sac-like structure opening by a single efferent duct. The wall of the sac, as well as that of the duct, is lined by cells of cubical epithelium. These cells secrete the sebaceous matter which is chiefly fat, which collects in the gland, the cells becoming transformed into the secretion and breaking down in the process. The separate sacculi, or little pouch-like divisions which make up each gland, may vary in number from 2 or 5 to 20. As a general rule the ducts of the sebaceous glands open into the hair-follicles, or sac-like involutions of the skin which surround and enclose the roots of hairs. But in many cases the ducts open simply on the external surface of the skin. There are generally two sebaceous glands in connection with each hair. A curious little parasitic mite, harmless in its nature — the *Demodex folliculorum* — is frequently found inhabiting the sebaceous ducts of the nose, especially when their secretion is pent up. This little organism is not known to occur elsewhere.

The sebaceous glands are first developed in the sixth month of embryonic life, and appear in their earliest condition as sac-like appendages to the hair-follicles. The secreting cells, containing fat particles, appear in the centre of the developing gland; these cells gradually enlarge and, escaping by the root or attached portion of the sac, constitute the first secretion of the gland. The functions of the sebaceous secretion are chiefly those of keeping the skin moist and from being cracked by the influence of heat and of the air. Friction between skin surfaces is also diminished in the same manner by the sebaceous secretion. The secretion is present in greatest amount in those races which inhabit warm climates and are greatly exposed to the sun's heat. Pimples and boils are the most frequent types of inflammation of the sebaceous glands. See HAIR; SKIN.

SEBAGO (sē-bā'gō) **SALMON,** the land-locked salmon of Sebago Lake, Maine, and a few neighboring inland waters, which has lately been widely distributed through fish-cultural operations. It was long regarded as a mere land-locked variety of the Atlantic salmon, but Jordan and Evermann consider it entitled to rank as a species (*Salmo sebago*) distinct from that and from the Ouananiche (q.v.). In Sebago Lake it averages about 10 pounds in weight. Its habits are like those of the typical species with such modifications as the physical differences between the ocean and lake make necessary. "In Sebago Lake in the fall, structural and chromatic changes occur, and it ascends tributary streams to spawn. After this function is performed it returns to the lake, which is its ocean, and resorts to deep water. In the spring as soon as the ice breaks up, when smelts, upon which it extensively feeds, are running up the streams to spawn, the salmon follow them." Consult Jordan and Evermann, 'Food and Game Fishes' (New York 1903), and American angling authorities generally.

SEBASTIAN, sē-bās'tĭ-an, **Saint,** a saint of the Roman Catholic calendar: b. Narbonne, Gaul, toward the middle of the 3d century; d. Rome, 20 Jan. 288. His position as captain in the Prætorian Guard at Rome gave him many opportunities of spreading Christianity, and protecting its adherents; but he was finally arrested and carried before Diocletian. The emperor ordered him to be shot to death by archers. A Christian woman named Irene, finding him still alive, drew out the arrows, took him home, and nursed him till he recovered. He then presented himself before Diocletian, and remonstrated with him for his cruelty; whereupon the emperor ordered him to be beaten to death, and his body to be thrown into the common sewer, whence it was taken by another Christian woman, called Lucina, who buried it at the feet of the apostles, Peter and Paul. In the 9th century his relics were carried to Soissons, whence they were dispersed through France, Spain, Germany and the Netherlands. A church was erected to this saint by Pope Damasus. Saint Sebastian is invoked against the plague, and is considered the patron saint of marksmen. His day is the 20th of January. There are many pictures of this saint by the Italian and other painters. He is generally represented as a beautiful youth tied to a tree and transfixed by arrows. The most famous pictures of his martyrdom are those by Luini, Bassi, Mantegna, Holbein, Paul Veronese and Ribera. In the cathedral at Lucca the subject has been treated in sculpture by M. Civitali.

SEBASTIAN, Dom, king of Portugal: b. 1554, d. 1578. He was the posthumous son of the Infant John by Joanna, daughter of Charles V, and ascended the throne in 1557, at the death of his grandfather, John III. During his minority the government was conducted by his great uncle, Cardinal Henry, brother of Emanuel the Great. He was educated by his guardian, Catharine of Austria, wife of John III (sister of Charles V). He was imbued with religious enthusiasm and a chivalrous desire to undertake a crusade. His constant dream was the conversion of Asia and Africa to Christianity, and the subjection of these continents to Portugal. At 20 he made an expedition to Ceuta, Tangier and Magazar, the only possessions that remained to the Portuguese from former conquests in Africa. From these places he suddenly fell upon the unsuspecting inhabitants and although no material results ensued, his lust for conquest became more confirmed. Soon afterward (1578) a war of succession broke out in the kingdom of Fez and Morocco. Mulei Malek, the youngest son of the last emir, had, contrary to his father's will, been excluded from the throne, but with foreign aid had finally succeeded in conquering his hereditary kingdom, and compelling his nephew, Mulei Mohammed, who had usurped it, to flee. The latter sought aid from Sebastian, who yielded to the request, hoping to effect something for Christianity and the fame of Portugal. In spite of the admonitions of his counselors, he equipped a fleet and an army, part of which he had collected in Spain, Germany and Italy, and sailed for Africa, 24 June 1578. The expedition reached Tangier in safety, but at Alcazarquivir was met by the far more numerous host of Mulei. Here on 4 Aug. 1578, a decisive battle was fought, in which Sebastian was completely defeated. Almost all his followers, including the best of his nobility, were either slain or taken prisoners, and he himself was among the missing. A corpse supposed to be the king's was found, but it was disfigured with so many wounds that identification was impossible. His death in consequence remained doubtful and gave occasion to the rise of several pretenders, the most notable of whom appeared in Venice 20 years afterward, and, after various vicissitudes, succeeded in arousing the sympathy of all Europe. Faith in his pretensions eventually subsided and he lapsed into obscurity. Consult D'Antas, Miguel, 'Les faux Don Sebastien' (1865).

SEBASTIANO DEL PIOMBO, sā-bās-tē-ä'nō dĕl pē-ōm'bō. See PIOMBO, SEBASTIANO DEL.

SEBASTOPOL, sē-bās'tō-pōl or sĕb-ăs-tō'-pōl, or **SEVASTOPOL** (Russ. sā-vās-tō'poly), Russia, in the government of Taurida, an important seaport in the southeast of the Crimea, on a harbor famed for its excellence — an inlet of the Black Sea, four and one-half miles long, one-half mile wide at the mouth and one mile wide further inland, afterward averaging one-half mile across. Depth from three to 11 fathoms. It is enclosed by high limestone ridges, and is accessible to the largest ships. The river Tchernaya enters the harbor at the east. The principal part of the town occupies a slope between South Bay or Dockyard Harbor, and Quarantine Bay. Prior to the destruction of the town (1854–55) it was solidly built; the forts were marvelous strongholds mounted by 700 guns and the docks were among its most important works. The dock basin was supplied with water by a canal from the Tchernaya. The town was almost unprotected on the interior side, however, but the temporary defenses erected by General Todleben, during the Crimean War (the most formidable of which were the works of Malakoff and Redan) have since that time become celebrated. These works were, however, at last captured, at the end of a memorable siege by the allied French and English forces, the Russians retiring after the town had been ruined. The French and English engineers then blew up the docks and forts, which, by the Paris treaty (1856), were not to be rebuilt. These restrictions were annulled in 1871 by the London conference. The docks and forts were restored by the Russian government in 1885, and Sebastopol is now again the naval port for the Black Sea fleet. The town was bombarded by the Turks in the great European War. The town has been partially rebuilt — it was once an important commercial port, but Kaffa (q.v.) has taken its place since 1899, in this regard. The value of imports entering this port was formerly over $5,000,000; of exports, $15,000,000. Sebastopol was founded on the site of Akhtiar in 1783, by Catharine II. Many historical reminiscences render this an interesting spot. The promontory where the town now stands was once occupied by the temple where Iphigenia, daughter of Agamemnon, officiated as priestess. Later, Greeks colonized the promontory, but were overcome by the Genoese, who established themselves at Balaclava. The ruins of the Genoese castles are still to be seen. Pop. about 77,000.

SEBILLOT, sā-bē-yō, **Paul,** French folklorist: b. Matignon, France, 6 Feb. 1846. He was educated at the communal college of Dinan, studied law at Rennes, and established himself in Paris as a notary, but soon abandoned the law for art. From 1870–83 he exhibited about 20 pictures at the Salon, but his travels through Saint-Brieuc, Pont-Aven, and various out-of-the-way sections of Brittany aroused an interest in folklore, and he gradually drifted from art to the study of folklore, on which he wrote a series of excellent books. He succeeded to Henri Martin's seat in the commission for Megalithic Monuments, became *chef du cabinet* at the ministry of public works, and in 1889 chevalier of the Legion of Honor. From its foundation in 1885 he was editor of the *Revues des traditions populaires.* His works include 'Contes populaires de la Haute-Bretagne' (3 series, 1880–81–82); 'Légendes, croyances, et superstitions de la mer' (2 vols., 1886–87); 'Litterature orale de l'Auvergne' (1898); 'Le folklore des pechèurs' (1901); 'La mer fleurio le rivage Marius et corsaires' (1903); 'Le folklore de France' (1904–07); 'Le folklore, litterature orale et ethnographie traditionelle' (1913).

SEBORUCCO, a narrow bench of coral rock margining a large part of the coast of Cuba. It is mostly a few yards wide and elevated about 15 feet above the sea. It is due to fringing coral reef raised by a general uplift of the island.

SECALE, *in botany,* rye, a genus of the *Triandria Digynia* class and order, in the natural order of *Gramina* or grasses. Essential character, calyx opposite, two-valved, two-flowered, solitary. There are four species; the villosum, orientale, creticum and cereale. Secale villosum or wood-rye grass is distinguished by a calyx with wedge-shaped scales, and by the fringe of the glume being woolly. The glumes of the secale orientale are shaggy and the scales of the calyx are shaped like an awl. The glumes of the secale creticum are fringed on the outside. The secale cereale or common rye has glumes with rough fringes. There are two varieties, winter and spring rye. The winter rye, which is larger in the grain than the spring rye, is sown in the autumn, at the same time with wheat, and sometimes mixed with it; but as the rye ripens sooner than the wheat, this method is exceptionable. The spring rye is sown along with oats, and usually ripens as soon as the

winter rye; but the grain produced is lighter and it is therefore seldom sown. See RYE.

SECAUCUS, N. J., borough in Hudson County, two miles north of Jersey City, on the Lackawanna Railroad. There are manufactures of chemicals and pearl buttons, and the town has large power houses. Pop. (1920) 5,423.

SECCHI, sĕk'kē, **Angelo**, Italian astronomer: b. Reggion nell', Emilia, 29 June 1818; d. Rome, 26 Feb. 1878. He entered the order of the Jesuits in 1833, and after teaching in various Jesuit colleges, including Georgetown University, Washington, D. C., he was in 1849 appointed professor of astronomy and director of the observatory at the Collegio Romano. When the Jesuits were expelled from Italy in 1870 he was permitted to retain his position. Father Secchi's services to astronomy were of the utmost value. He made a careful study of the physical constitution of the sun, the nature of sun-spots, and the solar prominences, but of much greater importance was his pioneer work, carried out with less perfect instruments contemporaneously with that of Huggins in stellar spectroscopy or astrophysics. He made the first systematic spectroscopic survey of the heavens and proposed a classification of stellar spectra under four main types, which has proved a valuable basis for subsequent research. Among his works are 'Catalogo delle Stelle di cui si è determinato lo Spettro luminoso' (1867); 'L'Unità delle Forze fisiche' (1869); 'Le Soleil' (1870); 'Le Stelle' (1877). Consult Pohle, 'Angelo Secchi' (1883).

SECESSION, the act of withdrawing from, a term of great political importance, especially in the history of the United States. Whenever a State has claimed the right to withdraw from the Union, it has based its claim on the doctrine of State sovereignty. This claim must be considered as emphatically distinct from the right of revolution, insurrection or violent revolts, in all of which there is no claim technically of legal right, and the appeal of which is to force instead of reason. Nearly every State of the Union, in its turn, has advanced the right of secession and usually each has been condemned by the others as treasonable. This claim was specifically brought forward or involved in the Kentucky «Resolutions,» the Hartford «Convention,» and the «Nullification Ordinance» (qq.v.). The election of Abraham Lincoln to the Presidency of the United States in 1860, when the political situation was flanked with sectional differences resting on State claims, was all that was necessary to change the theory of secession in the South into an attempt to effect the reality. South Carolina took the lead. No single State was prepared or willing to secede alone, but Florida, Mississippi and Alabama agreed to secede with any other State. Again South Carolina was leader in calling a State convention and on 20 Dec. 1860 the Act of 1788, ratifying the National Constitution, was repealed and it was declared «that the union now subsisting between South Carolina and other States, under the name of the United States of America, is hereby dissolved.» A declaration of the causes for this act was formulated and was adopted on the 24th. The governor proclaimed «the secession of South Carolina» the same day. Mississippi was the first to follow this example, 9 January 1861; then in succession came Florida, 10 January; Alabama, 11 January; Georgia, 19 January; Louisiana, 26 January; and Texas, 1 February, though in the case of this last State the proceedings were irregular. Virginia followed in April; Arkansas and North Carolina in May and Tennessee in June. The Civil War was the consequence and its final issue was the victory of the Union government and the full federation of the United States of America. See SECESSION IN THE UNITED STATES; UNITED STATES — SECESSION; CIVIL WAR.

SECESSION CHURCH, in Scottish ecclesiastical history, a religious body which withdrew from the Established Church of Scotland in 1733, when several preachers were ejected in consequence of their opposition to the law of patronage. The ejected ministers formed themselves into an ecclesiastical court, under the name of the «Associated Presbytery,» and published an act, declaration and testimony to the doctrine, worship, government and discipline of the Church of Scotland. In 1747 a division arose among the seceders respecting the legality of the burgess oath, in which burgesses profess «the true religion professed within the realm.» Those who asserted the lawfulness of the oath were called burghers, those who condemned it anti-burghers. In 1820 they were reunited as «The Associated Synod of the Secession Church,» several congregations of each party, however, refusing to accede to it. In 1847 the Associated Synod, joining with the Relief, constituted the United Presbyterian Church. See PRESBYTERIANISM; SCOTLAND.

SECESSION IN THE UNITED STATES. To properly understand the causes which led to the secession of the Southern States in 1861 and the reasons which actuated those by whom such action was advocated, we must confine our investigations to the history of the country and the conditions which existed prior to the dates when the seceding States withdrew from the Union. If we look back from the standpoint of to-day the events of over half a century intervene and we see but little of the picture which was presented at that period. We must study the theory of the Constitution as it was understood and explained by the creators of that instrument, and the history of the period prior to 1861, at least so far as it relates to constitutional rights and construction. It will also be interesting and instructive to consider the views entertained by the advocates of the State Rights doctrine as distinguished from the views of the extreme nationalists, and we must also become informed regarding the long-continued struggle between the leaders of these two parties. In 1860 not only the leaders but the Southern people generally were firm in the belief that a State had the legal right to secede from the Federal Union. This was the natural result of the teachings of more than half a century. Whatever opposition existed in the several State conventions or among the people of the seceding States arose not on the question of the principle of secession, the right to secede, but upon the expediency of seceding. Perhaps the most conspicuous example of the unity of the people of the seceding States is to be found in the proceedings of the Alabama Convention. A very large minority of this convention, for a while supposed to be a majority, was elected on the following platform: «That we hold it

to be our duty, *first*, to use all honorable exertions to *secure* our rights *in* the Union, and if we should fail in this, we *will maintain* our rights *out of the Union;* for, as citizens of Alabama, we owe our allegiance first to the State; and we will support her in whatever course she may adopt.»

With rare exceptions the arguments against such action were on the ground that it was inexpedient and inadvisable, but when the act was consummated it was generally recognized in the seceded States as the supreme law of the land, the exceptions being for the most part confined to a few counties in East Tennessee and the sparsely inhabited strip of mountain land known as the southwestern part of the Alleghanies. In this connection it is important to state that in 1861 and for years prior to that time this belief in the right of secession was by no means confined to the South, or to the so-called pro-slavery party. Horace Greeley, editor of the New York *Tribune,* was outspoken in upholding the right of secession, and for months after the establishment of the Confederate government army officers from the South openly discussed the question of remaining in the Union army or joining the Confederacy, and those who decided upon the latter course were allowed to go freely.

General Joseph E. Johnston and Col. Robert E. Lee both continued in the performance of their army duties in Washington for nearly two months after the inauguration of President Lincoln, the former holding the all-important position of quartermaster-general of the army of the United States; and it was after it was generally known that Colonel, afterward General, Lee had decided that it was his duty to give his fealty to his native State, Virginia, that Mr. Lincoln offered him the appointment as commander-in-chief of all the armies of the United States. At that time the authorities in Washington did not use the words treason and traitors in referring to the Southern officers who resigned their commissions and joined the Confederate army. But the results of the appeal to arms whereby the advocates of secession were overwhelmed have clouded and caused to be utterly forgotten the legal and logical principles for which the States Rights party had contended for three-quarters of a century.

Greeley said in 1860: «War is a hideous necessity at best, and a civil conflict, a war of estranged and embittered fellow countrymen, is the most hideous of all wars.» (New York *Tribune,* 16 Nov. 1860). And his words were prophetic. In the terrible internecine war of four years more than 1,000,000 human beings, most of whom were the youth of the land, fell in battle or succumbed to disease and the hardships of campaign, or were wounded and maimed; while in nearly every home, North and South, heartbroken mourners were crushed by the awful sacrifice to the God of Battles. During and at the close of the war every branch of the government was under the control of those responsible for the coercive policy which brought it on. With rare exceptions the whole press of the Northern States and its literature were dominated by the same influences. The chief executive and all his subordinates in the government with one acclaim pronounced the edict that those who had not supported their views should be made odious to the American people, and from that time the teaching to the youth of the land has been of this character. The causes which influenced the action of those who brought about the secession of the Southern States became utterly obscured and forgotten.

Causes of Secession.— The general assumption that slavery was the sole cause of secession and the war that followed is very far from correct. It is clearly to be seen that far away and beyond the question of slavery, even in the very earliest days of the life of the nation, the two parties began the struggle — the one to maintain the unrelinquished rights of the States, the other to establish and vest greater power in the central government. But although this leading question, and other cognate questions were really at issue in this conflict, slavery was the proximate occasion of the Civil War. The anti-slavery agitation focused and brought into active operation the theories of the extreme nationalists that the central government had the right to go into the domain of State governments and regulate their domestic affairs. And the threats of the abolitionists awoke the Southern people to the realization that the guarantees of the Constitution for the protection of slave property were to be nullified and, at least to that extent, the rights of the States destroyed. It is, therefore, necessary to review the history of this contributing, if not paramount, cause, without entering upon any discussion of the question of slavery itself.

History of Slavery.— Slavery was not only a heritage from the mother country, but the history of early colonial times shows that it was a forced heritage that was resisted and opposed by the colonies. In the same spirit the Southern people opposed slavery at the time of the Declaration of Independence and were vigorous in resisting the further importation of slaves from Africa. The wise men of that day foresaw the evils attending such a traffic. Its enormous profits would cause a further great influx of people hardly removed from savagery. But when slavery became a fixed institution, recognized, guaranteed and protected by the Constitution, the people of the South sought to ameliorate, so far as possible, all the evils attending it. Slavery was part of the common law of England prior to the settlement of the first colonies in America, and became the common law of the colonies; and at the time of the Declaration of Independence existed in each of the 13 colonies. As above stated, this condition existed despite the efforts of some of the colonies to terminate it. Judge Cooley in his continuation of Story's 'Commentaries on the Constitution,' says: «No colony was so persistent in its efforts to check the [slave] trade as Virginia, and Judge Tucker enumerates 23 acts on the subject, beginning with 1699.» Georgia, under Oglethorpe, prohibited the importation of slaves until 1752, when the proprietors surrendered the charter and the colony became part of the royal government, when the power of the colonists to prevent the importation of slaves ceased, the Crown prohibiting the exercise of any such power by the colonists. In 1760 South Carolina passed an act prohibiting the further importation of African slaves. The act was rejected by the Crown; the governor was reprimanded; and a circular was sent to all the governors of the

colonies warning them against presuming to countenance such legislation.

England not only considered the slave trade beneficial, and fostered and protected it, but had actually inaugurated and established it. Its first appearance in history is in the grant of a charter by Queen Elizabeth to a company formed to supply African slaves to the Spanish-American colonies — the queen herself being a shareholder in the company. In 9th and 10th William III an act was passed reciting that "the trade was highly beneficial and advantageous to the kingdom." In 1708 the House of Commons resolved: "That the trade was important, and ought to be free and open to all the queen's subjects trading from Great Britain." And as late as 1775 the Earl of Dartmouth, in answer to a remonstrance from the agent of the colonies, said: "We cannot allow the colonies to check or discourage in any degree a traffic so beneficial to the nation." And so popular was this traffic that slaves were openly sold in the public squares of London. Thus were the efforts of the colonies, led by Virginia, Georgia, Maryland and South Carolina, to put an end to the traffic, thwarted by the greed of the traders in the mother country.

The first African slaves imported into America were landed by a Dutch trading vessel at Jamestown in 1620, and from that time the traffic became general throughout all the colonies Pecuniary profit to the traders and the need of the negro as a laborer was not the only incentive to this traffic. The press and even the pulpit contended that it was humane and Christian to bring these heathen savage negroes to the protective care of civilized people. Slaves were imported in large numbers into New England until it became apparent that they were not fitted to the rigorous climate of the North. Importation to the northern colonies and States gradually diminished and finally ceased, but New England shipowners continued for many years to be actively engaged in the business of importing and selling slaves. Notwithstanding the reasons in favor of this business the leaders of thought among the Southern colonists continued to fight against the traffic, and Jefferson, in his first draft of the Declaration of Independence, brought forth, as one of the counts in his indictment of the king, "this cruel war against human nature itself . . . this piratical warfare," and charged that the king had "prostituted his negative for suppressing every legislative attempt to prohibit or to restrain this execrable commerce" in order to keep open a market for the sale of human beings. Jefferson gave, among other reasons for omitting this clause from the final draft of the Declaration: "Our Northern brethren also, I believe, felt a little tender under those censures; for, although their people had very few slaves, yet they had been pretty considerable carriers of them to others." This traffic against which the colonies had waged war for a century continued to exist at the time of the Declaration of Independence; and when the Constitution was adopted slavery existed in every colony with the possible exception of Massachusetts, where in 1781, not by legislative enactment, but by a decision of the Supreme Court of that colony, it was declared inconsistent with the declaration of the Bill of Rights that "all men are born free and equal."

The framers of the Constitution (q.v.) realized the sensitive and delicate nature of the question of slavery, and wisely left it untouched except to protect the property rights of the slaveholders and to give to Congress the power to prohibit the importation of slaves after a certain date. The third paragraph of section 2 of Article IV of the Constitution provided that "no person held to service or labor in one State, under the laws thereof, escaping into another, shall, in consequence of any law or regulation therein, be discharged from such service or labor, but shall be delivered upon claim of the party to whom such service or labor may be due." Under this clause Congress passed the Fugitive Slave Law (q.v.) of 1793. The first paragraph of section 9 of Article I of the Constitution provided: "The migration or importation of such persons as any of the States now existing shall think proper to admit shall not be prohibited by Congress prior to the year one thousand eight hundred and eight, but a tax or duty may be imposed on such importation, not exceeding ten dollars for each person."

The history of the adoption of this clause sheds much light upon the attitude of the Southern slaveholders. The first draft provided: "No tax or duty shall be laid, etc., on the migration or importation of such persons as the several States shall think proper to admit; nor shall such migration or importation be prohibited." South Carolina and Georgia insisted that the freedom of importation should be limited, and insisted upon a limitation as a condition of the Union; and the clause limiting until 1808 the prohibition against Congress of preventing such importation was finally adopted.

During the period from 1787 to 1808 the question of prohibiting the importation of slaves was entirely under the control of the States, and every Southern State which had not already done so enacted laws prohibiting further importation of slaves. Jefferson's earnestness in opposing the traffic has already been noticed, and Virginia was the first State to prohibit it. Georgia was the first State to incorporate such a prohibition in the Constitution. Henry Laurens of South Carolina writing to his son, 14 Aug. 1776, said: "You know, my dear son, I abhor slavery. I was born in a country where slavery had been established by British kings and parliaments, as by the laws of that country, ages before my existence. . . . Not less than 20,000 pounds sterling, would all my negroes produce, if sold at public auction to-morrow. I am not the man who enslaved them; they are indebted to Englishmen for that favor; nevertheless I am advising means for manumitting many of them, and for cutting off the entail of slavery. . . . I perceive the work before me is great."

Mr. Lowndes of South Carolina, speaking in the House of Representatives on 14 Feb. 1804, of the impossibility of prohibiting the importation of slaves into his State, said: "With navigable rivers running into the heart of it, it was impossible for us, with our means, to prevent our eastern brethren from introducing them (the negroes) into the country. The law was completely evaded."

In 1807 Congress passed an act prohibiting the importation of slaves into any part of the United States after 1 Jan. 1808. The vote in the House of Representatives was almost unanimous, being 113 against 5. Of the five who voted against it only three were from the South, one being from the Portsmouth district, New Hampshire, and one from Vermont. Mr. Betton from New Hampshire represented large shipping interests; and that the vote of Mr. Crittenden of Vermont was approved by the people of his State is shown by the fact that he was three times re-elected to Congress, and was subsequently elected governor and judge. This vote shows the absence of any sectional division of sentiment on the subject. In the meantime in 1784 Virginia had ceded to the United States the great Northwest Territory, and in 1787, before the adoption of the Constitution, the Congress had adopted the Ordinance for the Government of the Northwest Territory. This was adopted at the instance of Virginia, and its Sixth Article provided that "there shall be neither slavery nor involuntary servitude in the said Territory, otherwise than in punishment of crimes whereof the party shall have been duly convicted." In December 1805 the legislative council and house of representatives of the Indian Territory petitioned Congress to suspend the operation of the Sixth Article, and petitions of numerous inhabitants of the Territory, together with a letter of William Henry Harrison, governor of the Territory, of the same purport, were forwarded to Congress. These petitions were referred to a committee of seven members consisting of representatives from Virginia, Pennsylvania, Ohio, New York, Kentucky and South Carolina, who reported favorably to the petition, but no final action was taken by Congress. In January 1807 a letter from Governor Harrison enclosing resolutions unanimously adopted by the legislative council and house of representatives of Indiana, petitioning for the suspension of the Sixth Article and for the introduction of slavery, was laid before Congress. The matter was again referred to a committee whose members were drawn from various sections of the country. The committee again reported favorably, the House adopted a resolution suspending the article, but the Senate failed to concur in it and the matter was dropped.

Although the importation of slaves was prohibited the institution of slavery became more firmly intrenched in the slave-holding States, and at the same time a sentiment in favor of its abolition grew stronger in the non-slaveholding States. In 1819 a violent dispute arose between the North and South, the occasion being the proposal to admit Missouri as a State. After a year of bitter controversy a settlement was reached in a compromise whereby Missouri, with a constitution permitting slavery, was admitted, but as to the remaining portion of the territory of the United States lying north of lat. 36° 30′ N., it was provided that slavery should be prohibited. In the North the compromise was exceedingly unpopular, and a general movement looking toward the abolition of slavery was commenced. In 1840 and in 1844 the anti-slavery party had Presidential candidates in the field. The annexation of Texas, the war with Mexico and the further acquisition of territory furnished cause for additional controversy. In 1848 the anti-slavery party showed growing strength, and political campaigns took on increasing bitterness. The one side depended upon the guarantees of the Constitution to protect its property rights; the other insisted upon their right to prevent the extension of slavery, "while conceding," as Judge Cooley admits, "that the Federal government was powerless to disturb it in the States." During these times of fierce controversy the greatest minds from all sections of the country devoted their efforts to securing peace. Clay, Webster, Cass and Benton met in harmony and by their united efforts secured the compromise of 1850 by which California was admitted as a free State, new States were to be permitted to be carved out of Texas, the slave trade was prohibited in the District of Columbia and new Territories were to be organized without either expressly permitting or prohibiting slavery. But these compromises and all the efforts of the peacemakers were futile. The Missouri Compromise was repealed, the Fugitive Slave Law was nullified in the North, in Kansas armed conflicts occurred between the opposing factions, and in October 1859 John Brown with a band of Northerners made a raid into Virginia in an endeavor to incite the negroes of the South into insurrection, rapine and bloodshed.

The almost unanimous sentiment, North and South, upon the question of re-opening the African slave trade is shown by the vote on the following resolution introduced in the House of Representatives by Mr. Orr of South Carolina, on 15 Dec. 1856: "Resolved, That it is inexpedient, unwise and contrary to the settled policy of the United States, to repeal the laws prohibiting the African slave trade." This resolution was adopted by a vote of 183 to 8, and most of those voting against it explained their votes by stating that no proposition looking to the opening of the slave trade having been presented the resolution was out of place. In 1856 the anti-slavery party had made great progress and came near electing their candidate for President. It was hoped that the decision of the Supreme Court in the Dred Scott case (q.v.) would put an end to the political agitation, but the decision being adverse to the theories of the abolitionists added fuel to the flame. The Supreme Court and the venerable chief justice became objects of the most venomous abuse. In the controversy which now raged, moderation and reason seemed annihilated in the bitterness of feeling. The ablest minds of the North were exercised in constructing arguments to justify the coercive policy. Floods of anti-slavery literature were poured out before the impressionable youth. The pulpit and the lecture hall rang with appeals in which slander and denunciation were the key-notes, and the press took up and echoed their appeals.

While many people in the North were actuated solely by the belief that slavery was a wrong that should be abolished yet it was not until the question became one of national and political importance that the party opposed to the one in power used it as a means to secure control of the government. Like all other questions which become political, misrepresentations of the grossest character were made in order to attain political ends. Therefore, the pictures of slavery as presented to the Northern mind were in marked contrast to actual conditions as seen by those who were surrounded by them. It is true that there were

exceptional cases where there was apparent cruelty, and some cases where the slaves endured real hardships; and these cases were almost exclusively confined to the Mississippi and other alluvial bottom lands where the slaves were removed from the care and protection of their masters and were controlled by overseers, whose sole effort was each year to attain the highest financial results for their employers. But while the cases of hardship were few in number they were seized upon, colored and exaggerated in order to, so far as possible, inflame the Northern mind against the institution. The conditions as they appeared to the Southern people were, with rare exceptions, in marked contrast with the tales spread in the North. The planter of the South, or his ancestors, had seen the most degraded of human beings brought from Africa. Most of them had been, in their native land, slaves of tyrannical and cruel negro masters. They had become the property and in a certain sense members of humane, Christian families. The instincts of humanity and the interests of ownership had combined to lift these negro slaves from the lowest conditions of savagery into a state of civilization, where they were well fed, well clothed, protected and all their physical wants attended to, and furthermore where they were uplifted morally, surrounded by Christian influences and given Christian instruction. While slavery had its evils, history has record of no people who made so rapid an advance from a low condition of savagery and immorality to one of comparative civilization and moral responsibility as was shown by the improvement in the condition of the savage negroes that were brought to this country by the slave-traders. It has been charged that the Southern people took care of their slaves only because they were property and because the loss of a slave was a monetary loss. This charge is unjust in the extreme, and is in line with other calumnies which would deny all humanity to the slave-holding Southerners. The Southern people as a class cared well for their slaves, not only because they were property, but also because there was a real bond of affection between the master and the slave, and between all the members of the master's family and all the slaves in his house or on his plantation. Proof of the real conditions can be found in the following extract from Booker T. Washington's 'Up From Slavery':

> One may get the idea, from what I have said, that there was bitter feeling toward the white people on the part of my race, because of the fact that most of the white population was away fighting in a war which would result in keeping the negro in slavery if the South was successful.
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> In the case of the slaves on our place this was not true, and it was not true of any large portion of the slave population in the South where the negro was treated with anything like decency. During the Civil War one of my young masters was killed, and two were severely wounded. I recall the feeling of sorrow which existed among the slaves when they heard of the death of "Marse Billy." It was no sham sorrow, but real. Some of the slaves had nursed "Marse Billy"; others had played with him when a child. "Marse Billy" had begged for mercy in the case of others when the overseer or master was thrashing them. The sorrow in the slave quarter was only second to that in the "big house." When the two young masters were brought home wounded, the sympathy of the slaves was shown in many ways. They were just as anxious to assist in the nursing as the family relatives of the wounded. Some of the slaves would even beg for the privilege of sitting up at night to nurse their wounded masters. This tenderness and sympathy on the part of those held in bondage was a result of their kindly and generous natures. In order to defend and protect the women and children who were left on the plantations when the white males went to war, the slaves would have laid down their lives. The slave who was selected to sleep in the "big house" during the absence of the males was considered to have the place of honour. Any one attempting to harm "young mistress" or "old mistress" during the night would have had to cross the dead body of the slave to do so. I do not know how many have noticed it, but I think that it will be found to be true that there are few instances, either in slavery or freedom, in which a member of my race has been known to betray a specific trust.
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> As a rule, not only did the members of my race entertain no feelings of bitterness against the whites before and during the war, but there are many instances of negroes tenderly caring for their former masters and mistresses.

As a general rule (the exception being in the bottom lands where but few white people lived except the overseers, and where the worst and most untractable negroes were sent) the virtue of the negro women was carefully guarded by the slave-owners, and for several reasons. First, the Southern people were, as they are to-day, essentially religious and, as above stated, took great care of the moral training of the negroes. In most of the small establishments the mistress of the house assumed this as one of her duties, and on most of the large plantations where there were from 100 to 1,000 slaves, a chapel was provided and a minister employed to teach religion and morals. A plantation upon which there were no mulatto children was the more valuable, and conveyed an idea of commendation which attached to all who were connected with it. In the third place marriage and chastity among the slaves were fostered and promoted for property reasons. So far did the Southern people go in protecting the female slaves that regular patrols were organized for the purpose of arresting and punishing the lower class of white men who prowled around at night among the negro cabins. Of course the Southern people were greatly incensed by the gross misrepresentations as to their cruelty and immorality, and believed that the object of these misrepresentations was to arouse a sentiment which would lead to the attempt of the Northern people, acting through the national government, to interfere with the right of self-government guaranteed by the Constitution, and to deprive them of their property. And the feelings of resentment which naturally followed widened the breach day by day, month by month and year by year; until it became apparent that only a cessation of the agitation could prevent complete separation of the two sections. So that from the moment of the John Brown raid into Virginia the South saw the necessity of preparing to protect its rights and property — in the Union if possible — out of it if necessary. These were the conditions when, in 1860, the anti-slavery or Republican party elected its candidate, not so much by the strength in the North of its own following as by the division among the Democrats. By the vote which elected Mr. Lincoln the South was given to understand that the Constitution was to be disregarded and slavery destroyed, and so destroyed as to bring financial ruin, if not utter annihilation upon the South, for Wendell Phillips, a recognized leader, has said "The state of things is just what we have attempted to bring about. . . . The Republican party is a party of the North, pledged against the South." And the Southern people turned to the remedy which for three-quarters of a century they had believed to be the legal and proper one for

denial of rights by the national government, namely, withdrawal from the Union — secession.

The Doctrine of Secession.— As stated from the foundation of the Federal government until 1861, and even at that date, the right of secession was insisted upon not only in the South but in the North. In fact New England had been the first to advocate and threaten it. To discover the basis of this doctrine the history of the Federal government must be briefly reviewed. The colonies were settled by the Cavaliers in Virginia, the Puritans in New England, the Hollanders in New York, the Catholics in Maryland, the Quakers in Pennsylvania, the Huguenots in South Carolina and the followers of Oglethorpe in Georgia. The colonists of New England whose descendants spread westward were very different in their ancestry, their education, their beliefs and their customs, from those who settled the South and whose descendants spread over the Southwest. Those of New England were largely the descendants of the Roundheads of England, and entertained ideas similar to theirs. Those of the South sprang from the Cavalier class of England and France. The colonial States when they renounced their allegiance to Great Britain were separate and distinct commonwealths, entirely independent of one another. The desire for complete independence was the claim that welded their union in their efforts to achieve their common end. The political union of these independent colonies was based solely upon the terms of agreement and compact entered into by these separate and distinct bodies. The first union of this character was that formed by the 13 colonies in 1774, which was followed by the union of the States under the Articles of Confederation of 1777 (Maryland being the last State to ratify them, in 1781). On 4 July 1776, the colonies declared "that they are and of right ought to be *Free and Independent States*" — "that whenever any form of government becomes destructive of the ends for which it was established, it is the right of the people to alter or abolish it, and to institute a new government." In the Articles of Confederation the States, while agreeing to clothe the Congress with the powers of a common agent, expressly stipulated "that each State retains its sovereignty, freedom and independence and every power and right which is not, by this Confederation, expressly delegated to the United States in Congress assembled." Great Britain in Article I of the treaty of 3 Sept. 1733, "acknowledges the said United States, namely" (mentioning each of the 13 States), "to be *Free, Sovereign* and *Independent States*." The confederation under the Articles of 1777 was succeeded by the Union under the Constitution adopted by the 12 States assembled in Constitutional Convention (Rhode Island holding aloof) and subsequently ratified by all the States. It is to be remembered that until North Carolina ratified the Constitution in November 1789, and Rhode Island ratified it in May 1790, these two States were considered as entirely independent commonwealths.

In the Constitutional Convention, and therefore until 1861, the Supreme Court of the United States and the highest courts of the several States maintained in their decisions the principle of the unrelinquished sovereignty of each State, all holding that the central government had no right to exercise any powers, except such as were expressly delegated, or Congress to enact any laws except in pursuance of an express right granted by the States through the Constitution. This doctrine was formally enunciated in the tenth amendment to the Constitution: "The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people." The question of coercion of a State was raised in the Constitutional Convention and was quickly disposed of. When a proposition was made to empower Congress "to call forth the force of the Union against any member (meaning State) of the Union failing to fulfill its duty under articles thereof" — Mr. Madison said that "a union of the States containing such an ingredient seemed to provide for its own destruction. The use of force against a State would look more like a declaration of war than an infliction of punishment and would probably be considered by the party attacked as a dissolution of all previous compacts by which it might be bound." He hoped "that such a system would be framed as might render this recourse unnecessary, and moved that the clause be postponed." Madison's motion prevailed unanimously. Every similar proposition was rejected. George Mason said of such a proposition: "Will not the citizens of the invaded State assist one another, until they rise as one man and shake off the Union altogether?" Oliver Ellsworth in speaking to the Connecticut Convention said: "This Constitution does not attempt to coerce sovereign bodies, States, in their political capacity." Alexander Hamilton said in the New York Ratifying Convention: "To coerce the States is one of the maddest projects that was ever devised." Edmund Randolph, one of the most advanced of the Federalists, said that coercion was out of the question. When the States ratified the Constitution they expressed in no uncertain terms their insistence that the State could not be coerced and could at any time withdraw from the confederation and retake the powers granted to the Federal government. New York and Rhode Island said that "the powers of government may be reassumed by the people whenever it shall become necessary to their happiness." Virginia in ratifying did "declare and make known that the powers granted under the Constitution being derived from the people of the United States, may be reassumed by them, whensoever the same shall be perverted to their injury or oppression, and that every power not granted thereby remains with them and at their will." The principle of the right of secession had always been sanctioned by the people of Massachusetts. When it was proposed to annex Louisiana to the Federal Union, the legislature of Massachusetts passed the following resolution: "That the annexation of Louisiana to the Union transcends the constitutional power of the government of the United States. It formed a new confederacy, to which the States united by the former compact *are not bound to adhere*." And in 1844 and again in 1845 the same legislature resolved: "That the project of the annexation of Texas, unless arrested on the threshold, *may drive* these States into a *dissolution of the Union*."

Alexander Hamilton was without question one of the most extreme advocates of a strong central national government, but even he ex-

pressed himself emphatically that any attempt on the part of Congress to enact a law which involved the exercise of power which was not granted by the Constitution would be an invasion of the power reserved to the States. He discussed this question in the 31st number of the *Federalist*, and concludes in these words: «Hence we perceive that the clause which declares the supremacy of the laws of the Union, like the one we have just considered, only declares a truth which flows immediately and necessarily from the institution of a Federal government. It will not, I presume, have escaped observation, that it expressly *confines this supremacy to the laws made pursuant to the Constitution.*» At the time of the adoption of the Constitution, during the period of ratification and for many years thereafter this principle was not questioned. It was so thoroughly recognized that so long as any members of the Constitutional Convention remained members of Congress, and for a long period thereafter, that body confined its acts to expressly granted powers; and the messages of the Executive to Congress were only explanations of the condition and state of the Union — so very different from the messages since 1865 which are largely devoted to proposed policies of the administration, and exact from the President's party loyal obedience thereto.

In 1839 John Quincy Adams in his speech on the occasion of the 50th anniversary of our government under the Constitution said:

But the indissoluble union between the several States of this confederated nation is, after all, not in the right but in the heart. If the day should ever come (may Heaven avert it) when the affections of the people of these States shall be alienated from each other; when the fraternal spirit shall give way to cold indifference, or collision of interest shall fester into hatred, the bonds of political asseveration will not long hold together parties no longer attracted by the magnetism of conciliated interests and kindly sympathies; and far better will it be for the people of the disunited States to part in friendship from each other than to be held together by constraint. Then will be the time for reverting to the precedents which occurred at the formation and adoption of the Constitution to form again a more perfect Union *by dissolving* that which can no longer bind, and *to leave the separated parts* to be reunited by the law of political gravitation to the centre.

That Mr. Adams felt that these views were consistent with a true interpretation of the original compact which bound the people together is shown by the fact that three years later, 24 Jan. 1842, he presented to Congress a secession petition from citizens of Haverhill, Mass. In the *Congressional Globe* (Vol. II, p. 977) appears the following:

Monday, January 24.— In the House Mr. Adams presented the petition of sundry citizens of Haverhill, in the State of Massachusetts, praying that Congress will immediately adopt measures, peaceably to dissolve the Union of these States: First, because no union can be agreeable or permanent which does not present prospects of reciprocal benefits; second, because a vast proportion of the revenues of one section of the Union is annually drained to sustain the views and course of another section, without any adequate return; third, because, judging from the history of past nations, that Union, if persisted in in the present state of things, will certainly overwhelm the whole nation in destruction.

On the question of the reception of the petition, there were 40 votes in favor of it and 166 against. The following resolution was then introduced: «Resolved: That in presenting to the consideration of this House a petition for the dissolution of the Union, the member from Massachusetts (Mr. Adams) has justly incurred the censure of this House.» Another resolution was introduced declaring that Mr. Adams had offered the deepest indignity to the House and an insult to the people of the United States. In defending his position Mr. Adams said:

I hold that it is no perjury, that it is no high treason, but the exercise of a sacred right to offer such a petition, and that it is as false in morals as it is inhuman to fasten that charge on men who, under the countenance of such declarations as I have here quoted, come and ask this House a redress of grievances. And if they do mistake their remedy this government should not turn them away and charge them with high treason and subornation of perjury; but ought to take it up, to weigh the considerations which can be urged in their favor; and if there be none but those which are so eloquently set forth in the pamphlet I have quoted, these should be considered. If they have mistaken their remedy, the House should do as the gentleman from Kentucky (Mr. Marshall) told us he was ready to do — admit the facts.

«The trial of Mr. Adams, to the exclusion of all other business, commenced on 25 January, and terminated on 7 February, when the whole proceedings were laid on the table without deciding a single question.» This action of the House was construed by some as an admission that circumstances might arise which would justify States in withdrawing from the Union. Daniel Webster in his speech at Buffalo on 22 May 1851 denounced the anti-slavery agitators who were opposing the enforcement of the Fugitive Slave Law, and demanded that they should observe the laws and the Constitution. And a little later, at Capron Springs, he said:

How absurd it is to suppose that when different parties enter into a compact for certain purposes, either can disregard any one provision, and expect, nevertheless, the other to observe the rest. . . . I have not hesitated to say, and I repeat, that if the northern States refuse wilfully and deliberately to carry into effect that part of the Constitution which respects the restoration of fugitive slaves, and Congress provide no remedy, the South would no longer be bound to observe the compact. A bargain cannot be broken on one side and still bind on the other side. I say to you, gentlemen in Virginia, as I said on the shores of Lake Erie and in the city of Boston, as I may say again in that city or elsewhere in the North, that you of the South have as much right to receive your fugitive slaves as the North has to any of its rights and privileges of navigation and commerce. . . . I am as ready to fight and fall for the constitutional rights of Virginia as I am for those of Massachusetts.

Horace Greeley, the abolitionist, strongly insisted, in 1860, upon the right of the Southern States to secede, as the following extracts from the *Tribune* show:

New York *Tribune*, 9 Nov. 1860.— If the cotton States shall become satisfied that they can do better out of the Union than in it, we insist on letting them go in peace. The right to secede *may* be a revolutionary one, but it exists nevertheless.

And again in the same issue of his widely circulated and influential paper, Mr. Greeley said:

We must ever resist the asserted right of any State to remain in the Union and nullify or defy the laws thereof. To withdraw from the Union is quite another matter; and whenever a considerable section of our Union shall deliberately resolve to go out, we shall resist all coercive measures designed to keep it in.

New York *Tribune*, 16 Nov. 1860.— Still we say, in all earnestness and good faith, whenever a whole section of this republic, whether a half, a third, or only a fourth, shall truly desire and demand a separation from the residue, we shall earnestly favor such separation. If the fifteen slave States, or even the eight cotton States alone, shall quietly, decisively, say to the rest, "We prefer to be henceforth separated from you," we shall insist they be permitted to go in peace.

New York *Tribune*, 19 Nov. 1860.— Now we believe and maintain that the Union is to be preserved only so long as it is beneficial and satisfactory to all parties concerned. We do not believe that any man, any neighborhood, town, county, or even State may break up the Union in any transient gust of passion; we fully comprehend that secession is an extreme, an ultimate resort — not a constitutional but a revolutionary remedy. But we insist that this Union shall not be held together by force whenever it shall have ceased to cohere by the mutual attraction of its parts; and whenever the slave States or the cotton States only shall unitedly and coolly say to the rest, "We want to get out of the Union," we shall urge that their request be acceded to.

New York *Tribune*, 30 Nov. 1860.— Are We Going to Fight? — But if the cotton States generally unite with her in seceding, we insist that they cannot be prevented, and that the attempt must not be made.

New York *Tribune*, 24 Dec. 1860.— Most certainly we believe that governments are made for the peoples, not peoples for the governments; that the latter derive their just power from the consent of the governed; and whenever a portion of this Union, large enough to form an independent self-sustaining nation, shall show that, and say authentically to the residue, "We want to get away from you," I shall say, and we trust self-respect, if not regard for the principles of self-government, will constrain the residue of the American people to say, "Go."

New York *Tribune*, 28 Dec. 1860.— . . . Nor is it treason for the State to hate the Union and seek its disruption. A State, a whole section, may come to regard the Union as a blight upon its prosperity, an obstacle to its progress, and be fully justified in seeking its dissolution. And in spite of the adverse clamor, we insist that if ever a third or even a fourth of these States shall have deliberately concluded that the Union is injurious to them, and that their vital interests require their separation from it, they will have a perfect right to seek separation; and should they do so with reasonable patience and due regard for the rights and interests of those they leave behind, we shall feel bound to urge and insist that their wishes be gratified — their demand conceded.

During the time the States were seceding Mr. Greeley published many similar statements. Nor was the *Tribune* alone, for much of the New York press and prominent journals and able editors in many of the Northern States coincided in these views. «Wayward sisters, go in peace,» was the cry on every hand, echoed from the lips of the general of the army, with the refrain uttered by the eminent Republican leader Salmon P. Chase: «The South is not worth fighting for; let them alone.» The New York *Herald*, a journal which claimed to be independent of all party influences, said on 25 Nov. 1860: «Coercion in any event is out of the question. A Union held together by the bayonet would be nothing better than a military despotism.» And the same paper said: «Each State is organized as a complete government, holding the purse and wielding the sword, possessing the right to break the tie of the confederation, and to repel coercion as a nation might repel invasion. . . . Coercion, if it were possible, is out of the question.» The New York *Times* of 3 and 4 Dec. 1860 appealed to the people of the North to repeal the State laws preventing the return of fugitive slaves and by moderation and forbearance to prevent the threatened and almost inevitable dissolution of the Union. In March 1861, after Lincoln's inauguration, the *Commercial*, the leading Republican paper of Ohio, said:

We are not in favor of blockading the southern coast. We are not in favor of retaking by force the property of the United States now in possession of the seceders. We would recognize the existence of a government formed of all the slaveholding States and attempt to cultivate amicable relations with it.

In January 1861, after six States had seceded, James S. Thayer said, at a great meeting in New York:

We can at least, in an authoritative manner, arrive at the basis of a *peaceable separation*. . . . The public mind will bear the avowal, and let us make it,— that if a revolution of force is to begin, it shall be inaugurated at home. And if the incoming administration shall attempt to carry out the line of policy that has been foreshadowed, we announce that, when the hand of black Republicanism turns to blood-red, and seeks from the fragments of the Constitution to construct a scaffolding for coercion — another name for execution — we will reverse the order of the French Revolution, and save the blood of the people by making those who would inaugurate a reign of terror the first victims of a national guillotine!

These expressions were received with enthusiastic applause. At the same meeting ex-Gov. Horatio Seymour asked whether «successful coercion by the North is less revolutionary than successful secession by the South? At the same meeting ex-Chancellor Walworth said: «It would be brutal, in my opinion, to send men to butcher our own brothers of the Southern States as it would be to massacre them in the Northern States.» Other distinguished speakers and editors throughout the North and West repeatedly expressed the same sentiments. Even Mr. Lincoln, when delivering his inaugural address on 4 March 1861, although arguing the right to secede, did not openly enunciate the right of coercion, and while asserting his intention «to hold, occupy and possess the property and places belonging to the government, and collect the duties and imposts,» said that «beyond what is necessary for these objects there will be no invasion, no using of force, against or among the people anywhere.»

Course of Secession.— The Southern States having no hope of retaining or obtaining their rights under the Constitution except by a separation from the Federal government called conventions to decide upon what course to pursue, and ended by withdrawing from the Union. South Carolina took the lead, her Ordinance of Secession being adopted 20 Dec. 1860. Six other States quickly followed her in the following order: Mississippi on 9 January, Florida on 10 January, Alabama on 11 January, Georgia on 18 January, Louisiana on 23 January and Texas on 1 Feb. 1861. As one by one the Southern States fell into line asserting their right and determination to renounce the Federal compact, the United States officials in these States, both military and civil, peacefully turned over their charge within the limits of each State to the authorities of the same, the only exceptions being the isolated fortifications of Fort Sumter and Fort Pickens. The machinery of government went on without delay, the same officials performed their customary duties, and when the provisional government was established the only change was the substituting the authority and name of the Confederate States for those of the United States. On 21 Jan. 1861 Jefferson Davis, in his speech when relinquishing his seat in the United States Senate, said:

I rise, Mr. President, for the purpose of announcing to the Senate that I have satisfactory evidence that the State of Mississippi by a solemn ordinance of her people, in convention assembled, has declared her separation from the United States. . . . If it be the purpose of gentlemen they may make war against a State which has withdrawn from the Union; but there are no laws of the United States to be executed within the limits of a seceded State. A State, finding herself in the condition in which Mississippi has judged she is — in which her safety requires that she should provide for the maintenance of her rights out of the Union — surrenders all the benefits (and they are known to be many), deprives herself of the advantages (and they are known to be great), severs all the ties of affection (and they are close and enduring), which have bound her to the Union; and thus divesting herself of every benefit — taking upon herself every burden — she claims to be exempt from any power to execute the laws of the United States within her limits . . . We recur to the principles upon which our government was founded; and when you deny them and when you deny to us the right to withdraw from a government which, thus perverted, threatens to be destructive of our rights, we but tread in the path of our fathers, when we proclaim our independence and take the hazard.

Here in the words of the man who was afterward the chosen chief of the reorganized federation, the reason for secession is given and the right of secession claimed. The senators from Florida and Alabama withdrew at the same time.

The Peace Congress.— On 19 Jan. 1861, the legislature of Virginia in extraordinary session passed a resolution requesting all the States to send delegates to Washington to meet in convention on 4 February to confer upon some feasible and possible plan upon which to settle the difficulties between the sections. The body which is known in history as the Peace Congress sat in Washington from 4 to 27 February, but accomplished nothing. Five Northern States were not represented, and while there still existed a very conciliatory spirit in many parts of the North, it was unfortunate that many prominent men were bitterly opposed to the slightest concessions to the South. The speech of Judge Chase of Ohio, afterward Chief Justice of the United States, distinctly gave it to be understood that the Northern States would make no concessions. He said:

> The result of the national canvass which recently terminated in the election of Mr. Lincoln, has been spoken of by some as the effect of a sudden impulse or of some irregular excitement of the popular mind; and it has been somewhat confidently asserted that, upon reflection and consideration, the hastily formed opinions which brought about that election will be changed. . . . I cannot take this view of the result of the presidential election. I believe, and the belief amounts to absolute conviction, that the election must be regarded as a triumph of principles cherished in the hearts of the people of the free States. . . . We have elected him [Mr. Lincoln]. After many years of earnest advocacy and of severe trial we have achieved the triumph of that principle. By a fair and unquestioned majority we have secured that triumph. Do you think we, who represent this majority, will throw it away? Do you think the people will sustain us if we undertake to throw it away? I must speak to you plainly, gentlemen of the South. It is not in my heart to deceive you. I therefore tell you explicitly that if we of the North and West would consent to throw away all that has been gained in the recent triumph of our principles, the people would not sustain us, and so, the consent would avail you nothing.

The *Congressional Globe*, Vol. 31, Part 2, p. 1247 (27 Feb. 1861) contains letters from Senators Bingham and Chandler to Governor Blair of Michigan. Senator Bingham wrote as follows:

> Washington, 15 Feb. 1861.
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> Dear Sir:— When Virginia proposed a convention in Washington in reference to the disturbed condition of the country I regarded it as another effort to distract the public mind, and a step towards obtaining that concession which the imperious slave power so insolently demands. . . . We have been assured by friends upon whom we can rely that if those two States, Michigan and Wisconsin, should send delegations of true unflinching men, there would probably be a majority in favor of the Constitution as it is, who would frown down rebellion by enforcement of laws. . . . It cannot be doubted that the recommendations of the convention will have a considerable influence upon the public mind, and upon the action of Congress. . . .
>
> I hope I shall be pardoned for suggesting that it may be justifiable and proper, by any honorable means, to avert the lasting disgrace which will attach to a free people who, by the peaceful exercise of the ballot, have just released themselves from the *tyranny of slavery*, if they should now succumb to treasonable threats, and again submit to degrading thraldom. . . .
>
> K. S. Bingham.
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> To His Excellency, Governor Blair.

Senator Zach Chandler wrote:

> Washington, 11 Feb. 1861.
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> My dear Governor:— Governor Bingham and myself telegraphed you on Saturday, at the request of Massachusetts and New York, to send delegates to the Peace or Compromise Congress. They admit that we were right, and that they were wrong; that no Republican State should have sent delegates; but they are here and they cannot get away; Ohio, Indiana, and Rhode Island are caving in, and there is danger of Illinois; and now they beg us, for God's sake, to come to their rescue, and save the Republican party from rupture. I hope you will send *stiff-backed* men, or none. The whole thing was gotten up against my judgment and advice, and will end in thin smoke. Still, I hope, as a matter of courtesy to some of our erring brethren, that you will send the delegates.
>
> Truly your friend,
> Z. Chandler.
>
> His Excellency, Austin Blair.
>
> P. S.— Some of the manufacturing States think that a fight would be awful. Without a little *blood-letting*, this Union will not, in my estimation, be worth a rush.

These letters were promptly published in the Detroit *Free Press* and also in the *Congressional Globe*. Senator Powell commenting, in the Senate, upon the letters, said: «I think it evident from these letters that there is and has been a fixed purpose in certain quarters, that the peace conference should do nothing. It is very evident that these 'stiff-backed' gentlemen were to be sent in order to prevent any compromise being presented.» Senator Chandler said: «It is a question in which the people of Michigan take a great interest. They are opposed to all compromises; they do not believe that any compromise is necessary, nor do I. They are prepared to stand by the Constitution of the United States as it is; ay, sir, to stand by it to blood, if necessary.» A majority of the convention or congress was sufficiently moderate to recommend a measure to Congress which would, without doubt, have preserved peace and union, but when presented to the United States Congress it was met with cool indifference, objection was made to its consideration and upon a vote it was rejected.

The failure of the Peace Congress and the finally expressed determination of the government to make no concessions and to exercise the forces of the government in coercion forced Virginia and the other so-called border States from their conservative position. Arkansas adopted an Ordinance of Secession on 15 April, and Virginia on 17 April. In the latter State the Ordinance was to be made subject to the ratification of the people late in May, but the action of the Federal government in preparing for war and the proclamation of President Lincoln calling for troops hastened her union with her sister States of the South. Tennessee passed an Ordinance of Secession on 6 May, which was ratified by the people on 8 June, and North Carolina seceded on 20 May. Such a division of sentiment existed in Kentucky and Missouri that while they did not secede they were given representation in the Confederate Congress.

Formation of the Confederate Government.— In the meantime the several conventions of the first seven seceded States appointed deputies to a congress, naming Montgomery, Ala., as the place and 4 February as the time of meeting. This assembly formed a new federation under the name of the Confederate States of America, elected Jefferson Davis of Mississippi, President and Alexander H. Stephens of Georgia, Vice-President, and drew up a Constitution establishing a provisional government, and on 11 March adopted the permanent Constitution of the Confederate States. Alexander Stephens, who knew his people, had distinctly declared that «the tendency of the large majority of Georgia is to conservatism,» and this was true as well of all the other States. It was Mr. Lincoln's proclamation of 15 April that destroyed the last remaining vestige of the hope entertained by the conservatives that a return to the principles of the Constitution by the people of the North and the Federal government might bring about a reconstruction of the Union, a hope to which their hearts still clung tenaciously. Had not two States held aloof from the compact of 1787 to return in 1789 and 1790? Why might not history repeat itself? they thought and argued. The seat of government of the Confederacy was removed to Richmond, Va., and the Provisional Congress met there on 20 July 1861. At this session delegates from Virginia, North Carolina and Tennessee were added to the body. The Second Congress met on 22 Feb. 1862, with full representation from Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, South Carolina, Tennessee, Texas and Virginia. In the Second Congress which convened on 22 Feb. 1862, the 13 States above named were represented and delegates were present from Arizona and from the Cherokee, Choctaw, Creek and Seminole Nations.

Secession of West Virginia.—As above noted the Virginia Convention passed an ordinance of secession on 17 April 1861, which was submitted to the people and adopted by them. There was a majority against it in the northwestern part of the State. In June 1861, a convention of the Unionist counties was held in Wheeling. This convention adopted an ordinance for a reorganization of the State government, and in August adopted an ordinance providing for the formation of a new State. Most of the citizens being in the field as soldiers on one side or the other, a very small vote was polled, but a majority was for the formation of a new State. In May of 1862 the «reorganized government» of this part of Virginia passed a bill authorizing the formation of a new State. On 31 Dec. 1862, the Congress of the United States passed an act admitting the State of West Virginia into the Union, the law having the following preamble:

> *Whereas*, the people inhabiting that portion of Virginia known as West Virginia did, by a convention assembled in the city of Wheeling on the twenty-sixth of November, eighteen hundred and sixty-one, frame for themselves a Constitution with a view of becoming a separate and independent State; and whereas at a general election held in the counties composing the territory aforesaid on the third day of May last, the said Constitution was approved and adopted by the qualified voters of the proposed State; and whereas the legislature of Virginia, by an act passed on the thirteenth day of May, eighteen hundred and sixty-two, did give its consent to the formation of a new State within the jurisdiction of the said State of Virginia, to be known by the name of West Virginia, and to embrace the following named counties. . . .; and whereas both the convention and the legislature aforesaid have requested that the new State should be admitted into the Union, and the Constitution aforesaid being Republican in form, Congress doth hereby consent that the said forty-eight counties may be formed into a separate and independent State.

The End of Secession.—Although the Supreme Court of the United States several times decided that the seceded States were never *legally* out of the Union, yet for four years the secession of 11 States was an accomplished fact, and for four years the Confederate States of America was a *de facto* government, exercising, through its executive, legislative and judicial departments, all the powers and functions of a Federal government within the territory of the States which comprised it, under a constitution modeled upon the Constitution of the United States and adopted and ratified by the people of its States. In the States themselves there was no change nor interruption in any of the affairs of government except in the places which were occupied by the Federal armies. But by force of arms the Confederate government was overthrown and each of the seceded States, after a period of reconstruction, came back and took its place in the Union under the old Constitution as amended by the victorious party in the great conflict. See also CIVIL WAR; UNITED STATES — CAUSES OF THE CIVIL WAR; UNITED STATES — SECESSION.

BRIG.-GEN. JOSEPH WHEELER,
Author of 'Military History of Alabama.'

SECESSIONISTS, the members of an association in Germany similar to that formed in the Société des Beaux Arts at Paris. The Secessionists were artists who revolted against the strictly academic and traditional spirit in which selections and awards were made by the jury which decided the hanging of pictures in the Academy of Art and distributed the medals and other awards voted to their merits. In 1892 Piglhein (q.v.), F. von Uhde (q. v.), Dill, A. Keller, Stück and others founded a new school of naturalism, and this movement in German art was greeted with the same howl of derision as that with which the Pre-Raphaelites in England had been met. The movement gained ground, especially in Munich, however, the headquarters of a strong conservative and academic coterie. The new spirit here burst into actual revolt; and the members of the «Munich Secession» actually built a new exhibition building for themselves. Their work, moreover, won public recognition and the leaven of their example did its work in vivifying German art. The movement is now merged in the Deutscher Künstlerbund founded in 1904. Consult Bierbaum, 'Fritz von Uhde'; De la Mazelière, 'La peinture Allemande au XIXe siècle' (1900).

SECESSIONVILLE, sē-sĕsh'ŏn-vĭl, **Battle of.** In May 1862, Gen. D. Hunter, commanding the Department of the South, began preparations for throwing troops upon James Island to make a quick advance upon Charleston, S. C. On 2 June the advance of Gen. I. I. Stevens was landed in the southwest part of the island, and next day made a reconnaissance in force to within a short distance of a battery at Secessionville, about two miles from Stone River, with water on three sides. It was on a narrow causeway bordered by swamps, and approachable by land only from the west. The gunboats co-operated in the movement, which was but partially successful, the Confederates, under Lieut-Col. Ellison Capers, 24th South Carolina, defending the position and inflicting upon Stevens a loss of 17 killed and wounded and taking 22 prisoners. The effect was increased watchfulness on the part of the Confederates, the strengthening of the forces on James Island and the stoppage at Charleston of troops that had been ordered to Richmond to resist McClellan. On the 8th Stevens made another reconnaissance, came under artillery fire and withdrew with a loss of seven killed and wounded. On the same day General Wright's division arrived from Edisto

Island and the next day marched to near Grimball's Landing, two or three miles to the left of Stevens, who was covering the position opposite Legareville, on John's Island. It was determined to carry the battery by a rush, and thus open the way to Charleston, but 10 miles distant; and orders were given for an assault to be made at dawn of 11 June, but Col. T. G. Lamar, in command of the Confederate works at Secessionville, assumed the offensive and toward evening of the 10th attacked Wright's pickets and advance posts with infantry and artillery and was repulsed, suffering severe loss and inflicting upon Wright a loss of about 25 killed and wounded. This caused a postponement of the assault and the beginning of the construction of a battery to silence the Confederate guns. General Hunter, disappointed in his expectation of carrying Charleston with a rush, returned to Hilton Head on the 11th, leaving orders with General Benham, next in command, to make no attempt to advance on Charleston or on Fort Johnson until largely reinforced but to provide, however, for "a secure intrenched encampment." At the end of five days the battery had been constructed, but it failed to silence the Confederate guns, and Benham, as Hunter says, "disobeyed positive orders and clear instructions" and against the emphatic protest of his two division commanders proceeded to assault the work. He had for the purpose 3,100 men under General Wright and 3,500 under General Stevens. The work to be assaulted had an earthen parapet seven to eight feet high, outside of which was a ditch seven feet deep and in front of which was a strong abatis. A line of rifle-pits extended on both flanks and in the rear, sweeping the open interior of the work. Its armament was six heavy guns—8-inch columbiads and rifled 24- and 18-pounders. It was defended by about 1,000 men, and there were supports near that came at the close of the action. Stevens, with his 3,500 men, was to make the assault and Wright, moving from Grimball's Landing, was to co-operate by moving on his left and rear. Stevens had two brigades, Colonel Fenton's (8th Michigan, 7th Connecticut, 28th Massachusetts) and Colonel Leasure's (46th and 79th New York and 100th Pennsylvania), and four guns. At 3.30 A.M., the troops were assembled beyond the camps and at 4 A.M., when it was so dark one man could not follow another except at short intervals, the column moved forward, Fenton leading, with a storming party of two companies of the 8th Michigan, closely followed by the other eight companies of the regiment, the 7th Connecticut and the 28th Massachusetts. Leasure followed Fenton. The advance moved quietly and when within 800 yards of the work surprised and captured a small picket-guard without firing a shot and orders were given to accomplish the allotted task with the bayonet only. Lamar had knowledge of the movement and had sent for reinforcements and was standing by his heavy guns, which had been charged with canister, as the leading regiment came within 300 yards and deployed into line; then his guns opened their canister-fire, and at the same time heavy volleys of musketry from dikes and hedges were poured upon the right flank of the assaulting column. The Union regiments closed up rapidly and made a rush for the work, shooting down the gunners; all the regiments got close to the work and men of each went through the abatis; men of the 8th Michigan and 79th New York gained the ditch and scaled the parapet. "Some of them," says Beauregard, "in the impetus of the assault went even inside one of the salients of the works"; but it was of no avail; the mingled Union troops could not be handled and at 5 o'clock, after a severe contest of 25 minutes, they fell back 500 yards to a hedge, under cover of artillery, with a loss of over 500. Wright had participated in the movement by checking a reinforcement on its way to the work, but did not become seriously engaged, although losing some men. At 9 o'clock Benham ordered Stevens back to camp. The Union loss was 107 killed, 487 wounded and 89 missing, an aggregate of 683. The Confederates report a loss of 52 killed, 144 wounded and 8 missing. The result of the battle was fatal to the plan of an immediate advance on Charleston and late in June the Union troops were ordered to withdraw from James Island and for some time to come no further attempt was made to capture the city. Consult 'Official Records,' Vol. XIV.

E. A. CARMAN.

SECHEM, Palestine. See NABULUS.

SECHIUM, a genus of the gourd family (*Cucurbitaceæ*) with one species (*S. edule*). This is a perennial, rough-stemmed, climbing vine native to the West Indies and the neighboring mainland, sometimes cultivated for covering arbors, since it makes a rapid and sturdy growth, but chiefly for the valuable food afforded by its roots and fruits. It has large, thin, heart-shaped leaves five-angled like those of the cucumber; branched tendrils opposite the leaves, and yellowish, monœcious flowers, the pistillate solitary or paired in the axils, the staminate in a raceme. These flowers have rotate calices and five-parted corollas and a one-celled ovary with six-lobed stigma, which matures into a pear-shaped fruit, some six inches long. It has an irregularly ribbed or furrowed surface slightly spiny, but shining, and in color ranging from pale green to creamy tints; the interior is fleshy and white, and contains a large flat seed, which germinates within the pericarp, often before it falls from the vine, so that the whole fruit is planted. This fruit is edible, as is also the very large, corky and starchy root-tuber, sometimes weighing 20 pounds, and both are cooked as vegetables having somewhat the flavor of turnips. The sechium fruit is called vegetable pear in the British colonies, and has local names such as chayote or pepinella.

SECKENDORF, Friedrich Heinrich, frēd'-rĭH hīn'rĭH zĕk'ĕn-dōrf, COUNT VON, Franconian soldier and diplomat: b. Königsberg, 5 July 1673; d. Meuselwitz, Germany, 23 Nov. 1763. He served in the war against the Turks on the Danube, and in that of the Spanish Succession, greatly distinguished himself at Blenheim in 1704 and was present as an Ambassador at the conclusion of the Peace of Utrecht. He also served in the war against Sweden, 1715, and against the Spaniards in Sicily, 1720. In 1726 he was Ambassador to Berlin and gained over Frederick William I to acknowledgment of the pragmatic sanction and an alliance with Austria.

Seckendorf next served in the war of the Polish Succession, gaining victory over the French at Klausen. During the Turkish War he was made field-marshal in 1737, and commander-in-chief. He was unsuccessful, however, and was recalled and imprisoned in the fortress of Grätz. Receiving no appointment when released, he entered the service of Charles VII of Germany against Maria Theresa. He cleared Bavaria of Austrian troops, but on the emperor's death in 1745 peace was established and Seckendorf was restored to his Austrian honors. He retired to his castle at Meuselwitz, but in 1788 was imprisoned by Frederick II of Prussia, on a charge of intriguing against that country, and was only released after six months upon the payment of 10,000 thalers.

SECKENDORF, Gustav Anton von, BARON ("PATRICK PEALE"), German dramatist and novelist: b. near Altenburg, Germany, 26 Nov. 1775; d. Alexandria, La., 1823. He was educated at Leipzig, Freiburg and Wittenberg, became well known as a writer and lecturer and died while on a lecturing tour in the United States, where he was known as "Patrick Peale." His works include 'Otto III, der gutgeartete Jüngling' (1805); 'Kritik der Kunst' (1812); 'Beiträge zur Philosophie des Herzens' (1814); 'Des Vaters Bild' (1822), etc.

SECKER, Thomas, English prelate: b. Sibthorpe, Nottinghamshire, 1693; d. Canterbury, England, 3 Aug. 1768. He studied medicine at London and at Paris, and took his degree at Leyden in 1721, after which he decided to enter the ministry. He was graduated from Oxford in 1722, and in the following year was ordained a priest. His first living was at Houghton-le-Spring in 1724, and in 1727 became rector of Ryton and prebendary of Durham. He was appointed chaplain to the king in 1732, became rector of Saint James', London, in 1733, bishop of Bristol in 1735, of Oxford in 1737, dean of Saint Paul's in 1750 and archbishop of Canterbury in 1758. He was a wise, large-hearted and hard-working bishop, and an able though not a brilliant preacher.

SECOND, a division of time, the 60th part of a minute of time or of a minute of a degree. The hour and degree are each divided into 60 minutes (marked thus, 60′), and each minute is subdivided into 60 seconds (marked thus, 60″).

In music, the interval of a second is the difference between any sound and the next nearest sound above or below it. There are three kinds—the minor second or semitone, the major second and the extreme sharp second. Also a lower part added to a melody when arranged for two voices or instruments.

SECOND ADVENT OF CHRIST. See MILLENNIUM.

SECOND ADVENTISTS. See ADVENTISTS.

SECOND CENTURY. The outstanding feature of the history of the 2d century is the series of reigns of the so-called Spanish Cæsars. Trajan (98–117) who ruled when the Roman Empire was at its greatest extent was the first. His successors until 180 A.D. are all men selected for their tasks by wise predecessors, to become benevolent autocrats in the best sense of the word. Ruling the civilized world with firmness and wisdom, humanity is said to have had more chance for happiness under them than in any other corresponding period of the world's history, and yet even they persecuted the Christians. Trajan's successors were Adrian, or Hadrian (117–138); Antoninus Pius (138–161) and Marcus Aurelius (161–180). Each of these adopted a successor whom he thought capable of bearing the great burden of ruling the Roman Empire worthily. Marcus Aurelius, however, was succeeded by his son, Commodus (180–193), profligate and cruel to an extent that has made his name a by-word in history, weak and incompetent as a ruler, so that the barbarians played sad havoc on the frontiers of the empire. After Commodus, Pertinax (193) was proclaimed by the Prætorian guards who assumed the function of disposing of the empire. He was murdered after a reign of three months. Then the empire, offered for sale by the Prætorians, was bought by Didius Julianus (193) for some $10,000,000. He was put to death not long after by an order of the Senate and was succeeded by Septimius Severus, elected by the soldiers of the army of the Danube. Severus defeated two rivals for the empire who had also been elected by their soldiers and proceeded to give Rome a strong government. His reign was stained at the beginning of the 3d century by a bitter persecution of the Christians (202).

The Spanish Cæsars have an individuality that has won for each of them a special place in history. Trajan was a native of Spain and a soldier, elected by the Senate after the death of Nerva, who had made him an associate in the government. Trajan pushed the limits of the Roman Empire farther than ever before. He conquered Armenia and invaded the lands beyond the Euphrates to bring most of what had been Assyria under Roman rule. Out of the conquered territory he made three Roman provinces under their names of Armenia, Mesopotamia and Assyria. In the earlier part of his reign he had conquered the Dacians and thrown a bridge across the Danube, some of the piers of which are still standing. He brought a colony of Romans to settle in the conquered provinces, so that ever since it has been called Roumania. In honor of his conquests, Trajan erected at Rome the famous column called by his name, which tells the story of his Dacian wars. The spiral band of sculptures on it contains more than 25,000 figures. In spite of his beneficent rule, Trajan is responsible for the third persecution of the Christians, the first having come under Nero and the second under Domitian. A letter of Pliny the Younger to Trajan tells how rapidly this "contagious superstition" as he calls it was spreading throughout not only the cities but the towns and the country. Trajan feared that their refusal to sacrifice to the Roman gods would lessen their fidelity to the empire, so he began a bitter persecution. The blood of martyrs only proved the seed of new Christians and attracted world-wide attention to this faith for which men were ready to die.

Trajan's successor Adrian, another Spaniard born, did much to consolidate the Roman Empire. In person he superintended the construction of a wall across the northern part of what is now England, from the Tyne to Solway Firth. The remains of the old Roman wall can still be plainly traced over most of its course.

Then he spent some time in Gaul, proceeding to the East, everywhere to devote himself to the good of the empire. Whenever he stayed long in a city, he made it a point to leave some magnificent public structure, temple, arch, theatre or other building as a memorial of his presence there. He spent some time in Athens and did very much to restore its old glory. The last years of his reign he was at Rome, where he built the Pantheon, still one of the architectural wonders of the world, and a magnificent tomb for himself on the other side of the Tiber, not far from the Vatican, now known as the Castle of Saint Angelo. During his reign, the Jews who had flocked back in large numbers to Palestine from which they had been driven by Titus, had all their religious feelings outraged to the last degree by the attempt to place a statue of Jupiter on the site of what remained of their old temple. They revolted and more than half a million of Jews perished, nearly all of the survivors being forced into exile. This was the final dispersion of the Chosen People.

Hadrian's successor was his adopted son, Aurelius Antoninus, surnamed Pius. He reigned 23 years, during which the empire was absolutely peaceful and extremely prosperous. He devoted himself to the benefit of the provinces and the marvelously beautiful Roman aqueduct near Nimes in France erected by him is a type of his work for them. Happy peoples have no history and the greatest event in the reign of Antoninus was the association in the government with himself early in his reign of his adopted son, Marcus Aurelius. They are often spoken of as the Antonines and the 42 years of their reign from 138 to 180 are in Roman phrase a red-letter time for humanity. Marcus Aurelius (q.v.) was a philosopher of the Stoic school and his 'Meditations' (see MEDITATIONS OF MARCUS AURELIUS) probably represent the highest flight of merely human thinking with regard to man's duties toward himself, his fellows and the Author of the universe in which he is placed. Marcus Aurelius not only wrote and studied but worked. He accomplished an immense amount of good for the poor of Italy in a spirit that closely resembled that of Christianity.

It seems not unlikely that he was influenced by the Christian writings. He established homes for orphans and also for the old and made it one of the tasks of his life to see justice done. When the poor of Italy were loaded with taxes which had accumulated until they could not pay them, he caused all the tax claims to be heaped in the Forum and burned, thus freeing the people from an oppressive burden at one stroke.

Marcus Aurelius' life of meditation was rudely disturbed by the necessities of his reign as emperor. He had to direct and lead armies against barbarians on all frontiers. Roman generals defeated the Parthians and Aurelius was compelled to extend the Roman frontier in the East into Mesopotamia once more, though he had hoped that the Euphrates was sufficient protection. Teutonic tribes along the Rhine and the Danube compelled him to lead his legions himself and practically all his later years were spent in camp. Roman affairs were very discouraging after the period of peace and worse was to follow. The bubonic plague was brought back from the East by the armies who had fought there and it raged with fearful virulence. Some towns and districts were actually depopulated, the few remaining alive preferring not to dwell in the old scenes. Between wars and the plague, the Romans were tempted to believe that there must be some fault of theirs calling down the vengeance of the gods. They concluded that it must be the Christians' worship of a new god who had provoked the anger of the old gods. So much disaffection was created by this that finally the philosopher emperor, in spite of his own refusal to believe any such nonsense, was brought to consent to the beginning of the frightful persecution of the Christians which occurred in his reign. Ever since the year 112, under Trajan, the Christians had lived in the danger of persecution, at times tolerated, at others the subject of severe measures. This state continued in spite of the philosopher emperors for the full hundred years down to 211.

Commodus was a typical example of that non-heredity so often noticed in the sons of great men. Few men in the history of humanity have been worse. Born at Lanuvium in 161, he became emperor before he was 20, after having been a youth of great promise and apparently excellent character. His father wrote the 'Meditations,' it is said for the benefit of his son. How disappointed he would have been in him had he lived! For some three years, Commodus, under the influence of the wise counsellors, appointed by his father, was a model ruler. Then the discovery of a conspiracy against his life changed his whole character and his rule was little better than that of a maniac. He succeeded with almost insane cunning in securing the popular favor by brilliant shows and spectacles in the amphitheatre, and kept the Prætorians from revolt by bribery, meantime reigning as a disgrace to the royal dignity. Perhaps nothing in political history is so significant as the Senate of Rome voting to this lunatic who had perpetrated awful cruelties and almost unspeakable crimes *divine honors* and the added names, Pius and Felix. He was finally put to death by members of the imperial household who found that they themselves were soon to be the victims of his insanity, so they anticipated his designs.

Commodus was followed by the so-called "barrack emperors." The designation is due to the fact that they were elected by the army who, in nearly a century (192–284), chose 25 emperors, of whom 21 were murdered. Between them and the invading barbarians on every side, Rome sank rapidly into decadence. Greek intellect still maintained its primacy and one of the great men of the century is Galen of Pergamum, who spent some years at Rome as the physician of Marcus Aurelius. He was an indefatigable worker, who wrote hundreds of works on medicine of which 83 remain. He was one of the most observant physicians who ever lived and his works are a mine of acute clinical observation. He suggested that phthisis was best treated by fresh air and good food and that the best food was milk and eggs. He was long the supreme authority on medicine and especially during the Middle Ages his dicta were accepted as almost infallible. The development of medicine in modern times has made us realize how fortunate it was that the mediævals should have chosen so safe and sound a guide in medicine, though their reverence for him used to be set down rather as a fault than a virtue.

The two noteworthy victims of Marcus Aurelius's persecution of the Christians were Justin Martyr and Polycarp. Justin owed his conversion to the effect produced upon him by seeing the Christians suffer tortures and death so bravely. He had been a deep student of Plato and after his conversion he wrote the well-known Apology for Christianity and subsequently a second one and a Dialogue with the Jew Tryphon. These contain many autobiographical details. Eusebius mentions apologetic works addressed to Antoninus Pius and Marcus Aurelius. Justin suffered martyrdom under the prefect Rusticus (circa 165). His writings have continued to exert a deep influence on Christianity all down the centuries and as a very early witness he is of great significance. Of high, pure soul, in the midst of the paganism of the time, he found himself compelled, when brought in contact with Christianity, to admire the superhuman constancy it gave. He was taken by its pure moral teaching, and then after he had acquired knowledge of it was forced to accept its truth. His life and martyrdom are a supreme tribute to early Christianity.

The other victim of Aurelius' persecution was Saint Polycarp (69–155), who is often said to have known in his youth John the Evangelist and to have been deeply influenced by him. John lived on to the age of Trajan, so that Polycarp is the 2d century link with the Apostles. The old man was 86 when he was apprehended. His flock had hidden him and succeeded for years in keeping him from seizure. The proconsul urged him, when he was brought before the multitude in the Stadium, to curse Christ and save his life. Polycarp made his famous reply: "Fourscore and six years have I served Him and He has done me no harm. How then can I curse my king that saved me?" It was too late in the day to throw him to the wild beasts, the sports being over, so it was resolved to burn him, and the populace collected the wood for the fire. His career is just a typical example of a kindly old Christian who, in their superstitious desire to appease their gods so that Roman good fortune might return, was put to death by the mob.

Many of the Romans of the 2d century were very wealthy and not all of them spent their money foolishly or for merely personal pleasure. Some of them found a special pleasure in erecting magnificent structures for the adornment of the cities in which they lived and for the benefit of their fellow-citizens. Theatres, baths, temples and triumphal arches were often erected by the cities themselves, sometimes with the help of generous contributions from wealthy citizens. Aqueducts, bridges, fountains and other monumental works of definite public utility were also constructed through imperial or private beneficence. Some of them remain down to the present day or sufficient remains of them are left to enable us to appreciate how good was the taste and how fine the execution of such structures. One of the wealthy men noted for such beneficence was Herodes, surnamed Atticus, who enriched his native city, Athens, with a large number of structures, but particularly a huge marble stadium capable of accommodating the entire population of the city. He is said to have given over half a million of dollars in our values to aid the city of Troas in Asia Minor to build an aqueduct for the bringing of pure water into the city.

These beautiful buildings came in the midst of serious intellectual decadence. Magnificent theatres were erected in many places and yet no dramatic literature was written that has proved worthy of preservation. The older Greek plays were given occasionally for those who might be interested in Greek, but as a rule what attracted people to the theatre was shows of various kinds, "dancing girls, music and a spectacle." Ovid, in the preceding century, had declared that women went to the theatre much more to be seen than to see. Cicero had complained even in his time that the spectacle at the theatre had replaced the drama and was so elaborate that, as he writes to a friend, "it left no room for cheerful enjoyment, and I think you will feel no regret at having missed it. What is the pleasure of a train of 600 mules in Clytemnestra, or gay colored armor of infantry and cavalry in some mimic battle? These arouse the admiration of the vulgar; to you they would have brought no delight." The theatre grew worse, not better, and mere farces became the favorite plays of the 1st century, degenerating still further in the second. Beautiful theatres became, then, the scenes for only rough horseplay, the adaptation of the harvest amusements of the countryside, often with improvised dialogue and local hits and satires on the authorities, with interludes of music and dancing, but without anything approaching literature. The pantomime without words became a favorite and the city populations were losing both virility and intelligence. Above all, dancing girls imported from the various countries came to stimulate the jaded senses of the Romans and to show Roman women how to attract the attention of the men. The music and the dancing had no intellectual interest, but it had a sensual appeal, and that was what was sought. People were living for their senses and their bodies, as practically always happens when riches with luxury come to humanity, but had no intellectual interests worth while talking about. The 80 years under the Spanish Cæsars are the most peaceful years of the Roman Empire, and Gibbon has suggested that they are the happiest years of human existence, but such happiness evidently is not a source of intellectual achievement. Latin literature was very largely influenced during the latter part of the 1st and the beginning of the 2d century by the Spanish writers, the Senecas, Lucan, Martial, Quintillian, and in the 2d century by African writers. With the exception of Pliny, born at Como, whose letters are valuable for style as well as for matter, only those born out of Italy had any stimulus to write. Professor Wilkins suggested that "the language which had been unduly refined and elaborated now relapsed into a tasteless and confused patchwork, without either harmony or brilliancy of color." 'Apuleius' Golden Ass' is the one book from this time that is read in the modern time, but entirely because of its erotic interest. Melancthon is hardly too severe on the style of the book when he says that "Apuleius brays like his own ass." Aulus Gellius, the gram-

marian, writes better, though not much, and only the lawyers of the time seem to have known how to write Latin. Gellius is the last of the so-called Latin classics. The true literary tradition was lost. The century had, however, a number of Greek writers whose names and works deserve to be recalled. Ptolemy, the astronomer after whom the Ptolemaic system was named, and Lucian, the writer of satires, are the best known. Diogenes Lærtes, the Greek historian, and his colleagues, Arrian, Appian and Pausanias, are often referred to.

The most serious popular interest was the amphitheatre, where the gladiators fought with each other or with wild beasts, sometimes unto death. The people who sat on the benches lacked the courage to keep back the barbarian invasion already beginning, but they liked to be thrilled by the sight of blood and of bravery in others, and have the ultimate emotion of seeing people die. Rome set the fashion which was followed enthusiastically in the great amphitheatres built in so many of the cities of the Roman world. The special delight of the populace during the persecutions, and a state of persecution existed almost continually during the century, was to see the Christians thrown to the wild beasts. After a while some of them objected because the Christians went to death so calmly and made no resistance, though occasionally, of course, some timid soul lost confidence and escaped martyrdom at the last moment by offering incense to the gods or perhaps ran screaming toward the barrier when it was too late for rescue and the beasts intercepted him. Such incidents furnished some variety to the otherwise monotonous spectacle of seeing men and women and little children devoured by the wild beasts, but it must not be forgotten that the people who crowded to see such spectacles were not in any sense of the word barbarians, but on the contrary, as a rule, refined, well-dressed, educated Roman citizens, who bathed every day, often several times, had beautiful art objects in their homes, who ate many course dinners and sometimes had a country house as well as a city home, and who knew the classical Roman literature and often not a little about Greek literature.

JAMES J. WALSH,
Author of 'The Thirteenth Greatest of Centuries.'

PRINCIPAL EVENTS OF THE SECOND CENTURY.

117. Trajan, Roman emperor, dies and is succeeded by Hadrian who limits the Roman Empire at the Euphrates.
121. Caledonians drive the Romans out of Scotland. Hadrian builds the wall from the Tyne to Solway Firth to keep them out of England.
131. Revolt, massacre and exile of the Jews. Galen, the celebrated physician, born.
138. Completion of the Pantheon and Hadrian's Tomb at Rome.
Antoninus Pius begins a reign of peace and prosperity for 23 years.
155. Martyrdom of Polycarp at Rome.
161. Marcus Aurelius succeeds Antoninus Pius.
163. The bubonic plague ravages Europe. The Christians persecuted.
165. Justin Martyr put to death at Rome.
166. Rome sends an embassy to China, to establish a trade in silk.
180. Commodus begins to reign. Goths, settled on the Vistula and Oder, take possession of the coast of the Black Sea.
194. Commodus assassinated; Septimius Severus succeeds after the short reigns and assassinations of Pertinax and Didius Julianus.
196. Capture and destruction of Byzantium by Septimius Severus.

SECOND SIGHT, an extraordinary power of vision, mental or physical, real or imaginary, believed to be possessed by certain individuals. This belief, by many held to be superstitious, but by not a few regarded as having a basis in the natural laws of mental and sensuous perception, once prevailed throughout the Scotch Highlands and the Hebrides, where it has now almost wholly disappeared together with the belief in the Brownie or in the Greonach, the "Old Longbeard," and with the general use of charms and incantations. Like that superstition, however, it still lingers in retired nooks of the Highlands and of the Western Isles Second sight, called by the Scotch Gael *taish* (Irish Gaelic *taise,* fetch, spectre), is recognized by many eminent students of psychic phenomena as a faculty possessed by many persons whereby they have vision (or other sense-perception) of persons and occurrences at distances far transcending the range of normal vision or hearing. Dr. Samuel Johnson's definition of second sight and his illustrations of its phenomena are exact and without prejudice; he left the Western Isles deeply impressed with a philosophic curiosity regarding this mysterious faculty, not believing but only "willing to believe"; he could not "advance his curiosity to conviction." "The second sight," he writes, "is an impression made either by the mind upon the eye, or by the eye upon the mind, by which things distant or future are perceived, and seen as if they were present. A man on a journey far from home falls from his horse; another, who is perhaps at work about the house, sees him bleeding on the ground, commonly with a landscape of the place where the accident befalls him. Another seer, driving home his cattle, or wandering in idleness . . . is suddenly surprised by the appearance of a bridal ceremony, or funeral procession, and counts the mourners or attendants, of whom, if he knows them, he relates the names, if he knows them not, he can describe the dresses." It is seen that though *taish* means spectre, ghost, it means also phantasmal appearances of living persons and material objects — "phantasms of the living," as second sight of persons at a distance is called by the Society for Psychical Research. Dr. Johnson's reply to the objections of those who held second sight to be purely a delusion was that the thing was wonderful only because it is rare; considered in itself, he says "it involves no more difficulty than dreams, or perhaps than the regular exercise of the cogitative faculty." Particular instances have been given, with such evidence, as "neither Bacon nor Bayle has been able to "resist"; and the second sight of the Hebrides implies only the local frequency of a power which is nowhere totally unknown." ('Journey to the Hebrides,' Philadelphia 1810, 184 *sqq.*) Walter Scott's opinion of the reality of second sight was that "if force of evidence could authorize us to believe facts inconsistent with the general laws of nature" — as ascertained by him — "enough might be produced in favor of the existence of the second sight." Modern psychology has less fear of the overturning of the laws of nature by the admission of the power of second sight. The finally decisive word of psychological science upon the reality of this faculty has not yet been pronounced.

SECONDARY ENRICHMENT, a process of weathering chiefly effective on sulphide (q.v.) ores, whereby the ore is rendered much richer than it was when originally deposited. The process is largely the result of the affinity of oxygen for the sulphur of the sulphides. Above the water table (q.v.) the pores of the rock are easily permeated by the atmosphere and oxidation can readily take place. Any iron sulphide present is weathered to the oxide limonite which is very insoluble and remains behind in the upper part of the vein as an iron stain known as the Gossan, or Iron Cap. Sulphides of copper, zinc and other metals oxidize to soluble sulphates. These may in part be further altered, especially where the wall rock is limestone, and form carbonates or other compounds, which may remain in the oxidized zone or gossan above the water table. But since the sulphates are mostly very soluble they are usually carried down by the water to or below the water table, where by certain reactions with other sulphides present they are reprecipitated as sulphides. This is then a place of enrichment, where the vein has the metal it originally carried, and also that leached down from above. It is known as the enriched zone, or the secondary sulphide zone. Below this is a zone where the vein is of the original composition. This is known as the lean sulphide zone.

SECONDARY ROCKS. (*a*) Rocks formed during the secondary or Mesozoic Age of the earth. In this sense the term is rarely used now. (*b*) Rocks resulting from the alteration of other or primary rocks; among these are gneisses, schists, greenstones and rocks generally formed through metamorphosis, whether static, dynamic or thermic. Clastic rocks, being derived from originally deposited rocks, are also secondary, as are also in the strictest sense all non-clastic rocks which have resulted from the fusion and recooling or solution and reprecipitation of older rocks, that is, stalactites, silicious or calcareous tufts, etc. See SEDIMENTARY ROCKS.

SECRECY OF BALLOTS. See BALLOT.

SECRET SERVICE, United States, originally, a department or bureau of the Treasury Department, organized in 1864, and having 28 secret service districts throughout the country. The bureau was not originally created by law, nor recognized by Congress by special expense appropriations. While its duties are not definitely defined, the work of the bureau until recent years was largely the detection of counterfeiters, moonshiners, smugglers and other criminals who attempt to defraud the United States Treasury. During the Civil War the bureau was by necessity made an important branch of government service, the chief being a military officer with the rank of brigadier-general of volunteers. The assassination of President Lincoln brought about a more careful guarding of the person of the chief executive, and since 1865 secret service officers have invariably accompanied the President upon his journeys and during his absence from the White House. And since the shooting of President McKinley, secret service men have increased their vigilance in guarding. While certain trained secret service officers are detailed for this work, others are stationed in foreign countries, and a number of so-called revenue officers are constantly engaged in Kentucky, Indiana, Tennessee and other States, detecting the illicit distilling of liquor and bringing moonshiners to justice.

Counterfeiters.— The bulk of the work of the bureau for many years before the war has been the detection and punishment of counterfeiters. John E. Wilkie, chief of the service, in 1899 said: "Certainty of swift detection should perhaps prevent counterfeiting, but so long as there is a gambler's chance of escape, there will be found those who feel sure they can succeed where others have failed. Hence the necessity for the secret service branch of the government. And as the making of spurious money is a fascinating enterprise for a cunning rogue, so the checkmating of that same rascal in the countless schemes devised to yield an illegitimate fortune is a game of absorbing interest to him who plays it. The liberty of one, perhaps the life of one or the other, are the stakes in this battle royal. The advantage lies first with the law-breaker. He plans and works in secret for months and sometimes years; then stealthily, through trusted channels, the product of his labor is marketed and bad money is quickly turned into good. But work as he may, some imperfection in his spurious bills which has escaped him one day arrests the glance of the keen-eyed money handler. Familiarity with the characteristics of genuine money results in the involuntary detection of a counterfeit. No two cases are ever exactly alike, for the counterfeiter is a fertile fellow, and is a constant student and inventor of precautionary measures that he feels certain will insure his safety."

In the investigations made by the division, the chief has constantly before him the exhaustive daily reports of each man in the service, and a careful weighing of the various points submitted by operatives working often at widely separated localities will frequently suggest a move in the right direction. The gravity of the crime makes progress slow, for no step is taken till facts are established to warrant it. It is always considered desirable to so arrange the final act in this drama that the criminal may be taken wholly by surprise. There is a sort of momentary paralysis following the shock of sudden disaster, and when a raid is properly planned the chances of serious resistance are minimized. Occasionally it happens that it becomes necessary for a deal to be made directly with the handlers of spurious money, and in these cases it takes a man of nerve and keen wit to bring it to a successful issue. Such transactions are always fraught with great personal danger.

Informers.— There is small encouragement for the private citizen to aid the government in the arrest of counterfeiters as the following circular will show:

U. S. TREASURY DEPARTMENT,
SECRET-SERVICE DIVISION,
Washington, D. C. ————.

The general principles governing the action of this division in presenting *small* gratuities of money as an expression of its thanks to persons who perform meritorious service in bringing counterfeiters to justice are:

1st. Expenses incurred or services rendered in detecting crime against the United States, when unauthorized by this division, are not reimbursed or compensated by it.

2nd. As all United States officers are expected to aid in the suppression of crime against the United States when their attention is directed to any specific violation of law,

this class is excluded from receiving the gratuities awarded by this division.

3rd. All persons not of the foregoing class, who arrest and procure the conviction and sentence of a counterfeiter, or whose evidence is regarded by the prosecuting attorney as having been more material in the case than that of any other witness, upon application, in writing to the office of the Chief at Washington, D. C. (accompanied by a certificate from the prosecuting officer, which certificate should set forth the docket-record of the case, and state that the applicant is the meritorious person through whose agency a conviction of the counterfeiter was procured), will, if approved by the Assistant Secretary of the Treasury, receive a gratuity, the amount to be graded by various considerations — such as, the ability for mischief, and the antecedents of the person arrested and convicted; the length of the term of imprisonment for which he is sentenced; the quantity and character of counterfeit money and counterfeiting material captured with or through him.

No application for a gratuity in any case will be considered until all the counterfeit money and counterfeiting material connected with the case have been expressed to this office. (Express charges C. O. D.)

There are no blanks for use of such applicants. Persons in making application should state fully the service rendered for which a gratuity is asked.

In order to avoid errors and trouble, it should be the practice of all informers to put themselves in communication with operatives of this division, advising them of every movement. As a matter of protection in their rights, this course is indispensable, for an operative is bound to communicate daily to the office of the Chief all information he gains, so that his records, and those at headquarters, stand for the justification of the informer whenever he avails himself of their facilities.

In the absence of an agent of this division, informers should confer with United States Attorneys, Marshals, Commissioners, Collectors of Customs or of Internal Revenue, who will gladly advise with them on such matters.

This circular is not intended to give the holder any authority to act for the Secret Service Division of the United States Treasury Department. CHIEF.

Statistics.— The reports of William J. Flynn, the chief of the secret service, to the Secretary of the Treasury show that about 400 arrests are made annually. Of this number one-half are of persons manufacturing, passing or having in their possession counterfeit silver coin. The greatest activity of the counterfeiters was in 1896, when a total of $757,531 in notes and $10,678 in coin was captured. Since then the normal yearly find runs between $20,000 and $50,000 worth of notes and $10,000 to $25,000 worth of coin. The number of counterfeit printing plates captured which was 935 in 1895, in recent years is usually below 100. In 1916 of 417 arrests for counterfeiting 229 were convicted, 19 acquitted, 55 released for cause and the remainder awaited trial. California and Texas furnished the most delinquents.

The department has estimated that the average of counterfeit coin in circulation is three dollars in every $100,000, and of paper one dollar in $100,000.

There is to-day, as part of the Federal government, a new secret Service, which is larger and more powerful because of the greater latitude it is given in its work. Its duties take its agents to all points of the world. It is authorized to act for every branch of the government, and to handle all manner of cases of violation of the Federal statutes. It has come into being only in recent years, yet it employs more secret agents, spends more money, performs a greater variety of service, than has any other such body of men. It is under the Department of Justice, and its province is to gather evidence in all manner of cases that this department represents before the courts. Anti-trust prosecutions, violations of the national banking laws, land graft, bucket shop frauds, night riding, smuggling, peonage, white slavery, and above all treason against the United States come under its jurisdiction. In the work of all the departments it takes hold where investigations point to crime. There are investigating bureaus in most of the departments. These amass facts and figures but no evidence. The province of the new secret service is to procure evidence admissible in court in any case where the government may appear as the prosecutor. The force numbers several hundred and is supported by Congressional appropriation.

In the Philippines.— In the Philippine Islands there are 25 employees of the Secret Service Bureau under charge of a chief, since the organization on 7 Aug. 1901 of the Manilla district. Previous to that date the department was under the jurisdiction of the military authorities, when the duties performed consisted of general secret service work incidental to the military occupation of a foreign country, namely, to detect and frustrate plots against the government, locating and arresting insurgent leaders and the capturing of insurgent records and munitions of war, as well as performing all the criminal work necessary. At this time, the country being under martial law, arrests were made under that authority, without the application of civil process, simplifying to a great extent the duties of the secret service agents as compared with the present. As the insurgent army disbanded, great numbers of its officers and soldiers came to Manila, and as they had done nothing but soldier for many years, they were not disposed to settle down immediately to peaceful vocations, and were willing to engage in any pursuit that did not demand any mental or physical exertion. During the early days of American occupation, and while the Bilibid prison was still in charge of the Spanish authorities, great numbers of prisoners of the worst class effected their escape, and although the secret service office continually located them and returned them to prison, the majority remained at large. The Manila office maintains a correspondence with the other large cities of the Orient and the United States with reference to criminal information. There are on file about 3,000 photographs of convicted criminals of all classes and nationalities, together with a complete description of the same, and the records contain information pertinent to every political and criminal case which has ever come under the supervision of the Secret Service. The Post Office Department also maintains a secret department, though it is not so called, being named inspection department. Its duties are to protect the public against frauds carried on through the mail.

SECRET SOCIETIES have existed in all ages known to history, and among all classes of mankind, except, perhaps, savages of the very lowest type. In the ancient world they were chiefly religious, or at least professedly so, but in ancient times religious and temporal power were so closely associated that it was difficult, if not impossible, to draw a dividing line. There were the mysteries of Osiris and Serapis in Egypt, of Orpheus and Dionysus in Greece, of Cybele in Phrygia and of Mithras in Persia, all of which tended to surround the worship of the gods with elements of secrecy and awe, which appealed to the conscience and imagination of men, and helped to keep the ignorant multitude in submission to the hierarchy and

all that it represented. The tendency of ancient religions, in all countries, was toward secrecy and mysticism, and it was not easy to obtain admission to the inner circle of the elect. Once admitted, however, as a participant in the mysterious rites, the initiate became one of a fraternity whose influence was felt in every walk of life, and whose power even the most despotic tyrant did not care to defy. In ancient Egypt there was secret organizations, which taught the Eleusinian mysteries (q.v.), and among mystics to-day there is evidence of the influence of this secret body. Among Jews as well as Gentiles secret societies held potent sway. The Essenes (q.v.) were a religious sect, devoted sincerely to the purer life which the Pharisees, with less sincerity, professed, and their asceticism was attended by a large degree of mysticism. It has been claimed that Jesus Christ was a member of the Essene order. The Cabalists were successors of the Essenes, and also had their mystic practices and secret signs, and the Christian Gnostics were an exclusive sect with occult ceremonies and teaching.

In the Middle Ages the secret courts of Westphalia were practically vigilance committees, bound to secrecy by the very object of their existence. The Knights Templar were a secret order, although there is no trustworthy evidence that they were guilty of the practices alleged against them as a ground for the suppression of the order, and the seizure of its wealth.

The Freemasons originated in the combinations formed by operative masons in the Middle Ages for self-protection while they were building the cathedrals and other great structures which excite the admiration of the modern world. It is generally believed by students of antiquity that the origin of the order rests on a still more ancient body from which it sprung. Speculative Freemasonry, as it is called, was based on the more ancient form, and found in it a useful groundwork for the vast organization which has spread over the globe, and has its members in every class, from emperor and king to the toiler who works for his daily bread.

The secret societies which have arisen within the 19th century have been chiefly political and benevolent. The struggle for freedom in Italy gave birth to powerful secret organizations, which continued to exist after Italian unity had been gained, and have caused, at times, much anxiety to the authorities. Ireland has also had and still has a number of secret political societies, including the United Irishmen, the Fenians, the Orangemen and other orders of the past and present. In Russia the revolutionary society known as Nihilists (see NIHILISM) has slain one tsar, and is an ever-present menace to autocratic government. In China secret societies pervade every class of the population; some of them are continually hatching rebellion, and one of them, known as "Boxers," caused the attack on the legations at Peking, which provoked Europe and Japan to severe reprisals.

Coming down to modern American secret societies, we find that they divide naturally into groups. Many are concerned with political or semi-political movements, as the United American Mechanics and the Knights of Labor; others are of religious character, as the Rosicrucians, and various alliances and leagues within the several denominations; others foster temperance or some moral issue, as the Good Templars; others are fraternal, and have generally insurance features, as the Odd Fellows (q.v.) and Eagles (q.v.); others are approximately fraternal, as the Greek letter societies (q.v.) of the colleges; others grow out of trade alliances, as the ancient guilds and modern trades unions; the military also have their secret societies, of which the most conspicuous is the Grand Army of the Republic (q.v.) now being fast decimated by death, but surviving in the Sons of Veterans (q.v.). With very many of these there is little or no need of secrecy, and it is maintained largely to avoid the nuisance of visitors not in harmony with their work, or simply because they have become used to it, and it is hard to change custom.

The famous Tammany Society of New York, less generally known as the Columbian Order, dates from 1789, being only a fortnight younger than the republic itself; it was based on an earlier secret society, the Sons of Liberty of Maryland, one of those bodies that had to be conducted largely in secret, as developing the spirit that culminated in the Revolution of 1776. Tammany is now a wholly political body, within the Democratic party. (See TAMMANY). The Independent Order of Red Men (q.v.) developed from the same parent stock as Tammany, but along radically different lines of fraternity. It is one of many important societies, described and enumerated under the title of 'Fraternal Societies in America' in this Encyclopedia. A number of organizations have grown up in opposition to the spread of political activity of Roman Catholic societies. Early among these were the United American Mechanics (q.v.), the American Protective Association (q.v.), better known as the A. P. A., Sons of Seventy-Six, Order of the Star Spangled Banner and more recently Guardians of Liberty. Their policies have been directly opposed to those of the Ancient Order of Hibernians (q.v.) and the modern Knights of Columbus (q.v.). The Sons of Temperance (q.v.) is the earliest organization noted interested in this work, having been founded in 1843. It was later followed by the Independent Order of Good Templars, which had a vast following in 1875–85, but declined when Prohibition became prominent. A large number of the more important secret societies will be found under their respective titles.

There seems to be no doubt that secrecy of organization in America is on the wane, as the trend of public thought is toward publicity. Secrecy is a relic of the times when men were not permitted to think and act for themselves, and had to avoid domination. It is safe to assert that there is not an organization to-day in the United States, where secrecy is regarded as of great importance, even Freemasonry (q.v.) making public a great deal of its work and doings. The fact that so many secret organizations retain very large memberships seems to be due, not to the secrecy, but to their having engaged in useful or fraternal work, and having a mission to accomplish. There are secret societies that are bad, however. Of such societies with evil purposes, the most noted is the Mafia (q.v.), of Italy, which is said to have been introduced into the United States with the large Italian immigration, and to which many

crimes have been ascribed. The Molly Maguires were a society in the Pennsylvania coal regions, about 35 years ago, organized for the objects of terrorism and murder. It was suppressed by a relentless prosecution on the part of the State, and the execution of the leaders. Consult Heckethorn, 'Secret Societies of All Ages'; de la Hodde, Z., 'Secret Societies of France'; Frost, 'Secret Societies of the French Revolution,' etc. See SOCIETIES, CRIMINAL; KU KLUX KLAN; ESSENES: FRATERNAL SOCIETIES IN AMERICA; MASONIC FRATERNITY; ODD FELLOWS, and other secret societies under their respective titles.

SECRET SOCIETIES, College. See GREEK LETTER SOCIETIES.

SECRETARIAL EDUCATION. The distinction between the secretary and the stenographer is not sharp. The duties of the two frequently shade the one into the other. The stenographer of course has distinctive abilities. He knows some system of shorthand, he is a typist and he can transcribe his shorthand notes on the typewriter. The secretary, on the other hand, while he will find these abilities of the stenographer useful, will find that they are only a small beginning of what he needs. In fact the secretarial range of usefulness is very wide, too wide to be wholly comprehended in a single course of training. It is advisable to consider secretarial education under two heads, general or preparatory education and technical or special education.

Whether we have in mind the general or technical training it is necessary to classify the secretarial work. We may distinguish between the private or personal secretary and the institutional or organization secretary. The latter is a person who records the minutes of meetings of boards of trustees, boards of directors, committees, etc. This type of secretary needs very little technical training but should have a good general education. The private or personal secretary may be a social, educational, literary, political, ecclesiastical or business secretary, according as he serves a person engaged in any of these professions or occupations. The word secretary has its best application only in this sense, signifying a person who has charge of the *secreta* (secrets) of his employer.

Secretarial education presupposes a thorough high school or other secondary school course. After this preparatory training follows a liberal education with major emphasis on the particular field in view. The prospective social secretary gives major emphasis to philanthropy, history, art, literature. The prospective educational secretary centres his major interest on comparative education, educational administration, the philosophy of education, history of education, etc. The literary secretary must have literary taste, a knowledge of style and a wide acquaintance with the world's best literature. The political secretary will need thorough acquaintance with history, economics, sociology, law, etc. The ecclesiastical secretary must add to a liberal education a knowledge of church polity. The business secretary must lay emphasis on economics, geography, industrial history, commercial law, accounting, sociology and psychology. It is clear that the best results can be obtained only when the general education has consciously aimed at the particular field in which the secretarial duties are to be performed. Without such general education the secretary remains merely a clerk or a stenographer.

Secretarial education in its technical or specialized form should, therefore, be assigned to the last two years of the regular college course or, preferably, it should be a graduate course. With collegiate courses as a background, this technical training can be given in one or two years. It should offer the following features: Applied psychology, correspondence, business organizations, office management, filing systems, publicity methods, library methods, including cataloguing, business law, finance, stenography, typewriting.

History of Secretarial Education.— Business colleges have undertaken the training of secretaries but they have been unable to command the best standards of preparation or of training. They admit as students persons who have had less than a grammar school education. Their product is, therefore, defective in the use of English, frequently inaccurate in the use of ordinary office machinery, and wholly unprepared for the secretaryship as outlined above. The best business college product furnishes good material for stenographers.

High school commercial departments are rapidly entering this field. Their entrance requirements are higher and they give a broader training in language, history, science, etc., but they often fall short of thoroughness in the mechanics. That is, they give insufficient time to secure the necessary speed and accuracy in stenography and typewriting. The high school commercial product at its best approaches a secretarial standard but falls far short of the best conception of the secretaryship.

Both the business college and the high school commercial department are temporary means for meeting an ill-defined need. As the secretarial definition becomes clarified, the demand grows for a higher type of training. Colleges are adding secretarial courses and several universities are offering advanced courses in Business Administration. Among them are Simmons College, Harvard, Yale, New York University and others. A typical undergraduate secretarial college course is the following: *Freshman year:* English, French, German, history, hygiene, physics, filing. *Sophomore year:* English, French, German, history, penmanship, stenography, typewriting. *Junior year:* Business law, economics, English, stenography, typewriting, French, German, history, sociology. *Senior year:* Accounts, business methods, commerce, commercial teaching, economics, education, English, French, German, government, history, sociology, Spanish. A typical graduate course, open only to students who have already earned the bachelor's degree, is the following: Accounts, administration, business practice, stenography, typewriting, business law, library practice, commerce.

A. R. BRUBACHER,
President, State College for Teachers, Albany, N. Y.

SECRETARY-BIRD, or **SERPENT EAGLE,** a remarkable raptorial bird (*Serpentarius secretarius*) of South Africa, representing alone the family *Serpentariidæ*, associated

with the vultures. The general aspect of the bird is that of a long-winged, long-tailed, gray-and-black hawk mounted upon very long legs, so that as it stalks across a plain it might easily be mistaken for a crane. It runs with the speed of a horse and will fly when forced to do so, and may soar to a considerable height. It builds a big substantial nest in some bush or tree and reoccupies it from year to year. Their food consists of small animals and reptiles of all sorts, and especially of snakes, which it kills with a powerful forward kick, or, if the first stroke is not effective, repeats it with feet and knobbed wings, actively dodging the serpent's lunges, until the reptile is disabled or dead. These birds are frequently tamed and kept about the farmyard in South Africa as vermin destroyers. They take their name from the tufts of erectile feathers growing on each side of the head, which suggest a bunch of pens stuck behind a clerk's ear: the Arab name means "thirty ears." Consult Evans, 'Birds' (New York 1900).

SECRETARY OF STATE, an officer whose business is to superintend and manage the affairs of a particular department of government. In the United States the Secretary of State has entire charge of foreign affairs, consular agencies and diplomatic matters. He is a member of the President's Cabinet and is usually considered the principal adviser to the chief executive. In Great Britain there are five secretaries of state, namely, those for the Home, Foreign, Colonial, War and Indian departments. The Secretary of State for the Home Department has charge of the privy signet office; he is responsible for the internal administration of justice, the maintenance of peace in the country, the supervision of prisons, police, sanitary affairs, etc. The Secretary for Foreign Affairs conducts all correspondence with foreign states, negotiates treaties, appoints ambassadors, etc. The Colonial Secretary performs for the colonial dependencies similar functions to those of the Home Secretary for the United Kingdom. The Secretary for War, assisted by the commander-in-chief, has the whole control of the army. The Secretary for India governs the affairs of that country with the assistance of a council. Each secretary of state is assisted by two under-secretaries, one permanent and the other connected with the administration, with numerous subordinates. The Chief Secretary for Ireland is not a secretary of state, though his office entails the performance of similar duties to those performed by the secretaries of state. In 1885 the office of Secretary for Scotland was revived; he exercises in Scotland many of the powers and duties of the secretary for the home department, but has no cabinet rank by virtue of his office. The Secretary to the Admiralty is a subordinate member of the government, always a member of the House of Commons, in which he represents the Admiralty when the First Lord of the Admiralty is a peer. A secretary of embassy, or of legation, is the principal assistant of an ambassador or envoy.

SECRETION, the process whereby certain structures — glands or membranes — elaborate, separate or secrete, from the common medium presented by the blood, definite and specialized products destined either for use in the economy of the body, or for being sent out of the organism. In this way the process of secretion subserves a double function, or exhibits a double aspect, inasmuch as it not only manufactures products for home consumption, as it were, but provides also for the removal of waste matters from the body. Substances or products elaborated for the use of the organism are named secretions. Products secreted only to be discharged from the organism are called excretions. Take the liver and its bile as an example of a true secretion destined — primarily, at any rate — for use in the body, that is to say, in the process of digestion and elaboration of food; then as an illustration of the excretory form of the process, observe the kidneys and their secretions, these organs secreting from the blood urea, carbonic acid and other products which, in the form of urine, are destined to be discharged sooner or later from the body. The work of secretion is thus primarily seen to be among the most important of those actions the perfect performance of which contributes to the welfare of the organism; and interruption to the secretory processes results necessarily in the induction of disease of more or less serious kind. As both secretions and excretions are poured out from the secreting organ either upon the outer surface of the body or into some of its internal channels or ducts, it would appear that the two processes are identical in their ultimate aims and ends.

But true secretions (for example, bile and milk) consist of substances or compounds which, as such, do not exist in the blood, but demand a process of elaboration in the glands or secreting structures for their due and perfect formation. Excretions, such as the urine, consist of substances which exist in the blood in a form somewhat related to the final product. The elements are collected and thrown out more or less as such. Secretions exist *potentially* in the blood, and require for their elaboration definite and special structures. Excretions actually exist in the blood, and demand for their elimination and separation processes more analogous to mere filtering, and less complicated than those demanded by the work of secretion. This latter distinction receives practical confirmation and support from the fact that when excretions are checked in their natural discharge they may appear in their characteristic form in the blood. This result is well seen in cases of suppression of urine through disease or injury of the kidneys. But if true secretions be checked they cannot, under the same or ordinary circumstances, be detected in the blood; and removal of the secreting organ forever prevents the reappearance of the secretion. A pent-up secretion may be reabsorbed by the blood, and be detected in that medium, but this does not affect the grand distinction to be drawn between the actual nature of and differences between the two processes.

The essential structural characters of a secreting surface consist, firstly, of a structureless primary or basement membrane; secondly, of blood-vessels, which bring the blood from which the secretion is elaborated; and lastly, of cells or special structures devoted to the further elaboration of the constituents derived from the blood. A simple membrane, such as a serous or mucous membrane, exhibits the ar-

rangement of these elementary parts in its simplest phase; while more complicated arrangements of the same essential parts result in the formation of the more definite secreting parts which we term glands. Of these structures, in themselves constituting most of the chief organs or viscera of the body, three great plans may be distinguished, so far as the arrangement of their elementary parts is concerned. Thus the simple tubular glands — well exemplified in the tubular follicles of mucous membranes, in the gastric follicles or glands of the stomach, in the sweat or sudoriparous glands of the skin, etc.— consist of simple tubular involutions or depressions of the membrane which forms them, or with which they are connected. Each consists, therefore, of an open and elongated pouch or vesicle, the wall of which is composed of the primary membrane, while its lining is formed of secreting cells. This primary and elementary form of glands may be complicated by presenting a saccular rather than a merely tubular form, or by having the simple tube developed in a coiled form. The aggregated or conglomerate glands form the second division of gland structures. Such are the true mucous glands of the membranes of that name, the salivary and mammary glands, the prostate gland and the pancreas or sweetbread. These glands exhibit an essential structure composed of rounded clusters of vesicles termed acini, grouped together in various ways, which contain gland-cells, and which open by minute ducts gradually uniting to form the main duct of the gland. These acini or vesicles, as before, are lined by secreting cells. The third variety of glandular structures is that comprised in the idea of convoluted tubular glands. The kidney and the testicle exemplify this latter class of structures. In these glands we find tubules of basement membrane of generally uniform size, presenting a convoluted appearance, and terminating either in blind pocket-like extremities or by dilatations, as seen in the Malpighian corpuscles. (See KIDNEYS.) Sometimes, however, such tubular structures may, as in the testicle, form a loop, and then return along their original course. The tubules are lined by their secreting cells, and in their tortuosity evince a structure which presents a large secreting surface frequently comprised within a very small space or extent.

The exact means or rationale whereby each gland is enabled, from the common medium furnished to all, to elaborate through its own special cells its characteristic secretion, presents a problem from the perfect solution of which physiological science seems as yet far off. The cells of the liver contain bile; those of the mammary gland contain the fatty particles of the milk; and those of the testicle spermatozooids. But it can only be said that cells secrete; of the origin of these secreting powers and of the exact manner in which they are exercised nothing is known; yet that some acute and distinct specialization of the powers of secreting or gland-cells takes place over those of other and ordinary cells there can be no doubt whatever.

The view that secretion and the great process of nutrition (q.v.), to which secretion ministers, are identical is a reasonable and thoroughly consistent opinion. Viewed as mere organs, and apart from all purely functional considerations, the structure and formation of secreting glands might be regarded as simply processes of pure nutrition.

The greater the vascularity or blood-supply sent or distributed to any secreting organ the greater generally are its secreting powers. But the rate of circulation through a gland, or the mere quantity of the blood itself, cannot be shown to exert any direct influence on its secretory powers. Secretions may be retained for a lengthened period in some glands — such as the testicle — which are only periodically active, or they may be almost continually discharged, as is the case with the secretion of the kidneys. Under stimulation most if not all glands secrete more rapidly and abundantly, but the nature of the stimulation varies in different cases, or may be either of normal or abnormal kind. The discharge of secretions is effected by pressure from behind, while occasionally, as in the ureters and bile-ducts, the pressure of muscular fibres aids in the expulsion of secretions. The particular quality of blood may affect secretion, as at certain times a greater quantity of a particular material may be contained in the blood, the presence of this material stimulating the action of some appropriate gland.

The influence of the nervous system is important in connection with the general conditions of secretion, but much belonging to this topic exists in a still obscure state. It is known, however, that by regulating the supply of blood to a gland the nervous system may indirectly operate in preventing or forwarding the work of any gland, and that through the agency of conditions acting upon the nervous centres and upon the vegetative nervous system, effects are respectively wrought upon the glands. Food in the mouth induces a reflex action (q.v.), which action, produced through impressions made on nerve centres and reflected to the nerves of the salivary glands (q.v.) induces a copious flow of saliva through the stimulation of the glands. Mental conditions alone, and without material stimuli, will excite secretion, as seen in the flow of tears, or in the flow of saliva following the description of dainties; while the sudden stoppage of the milk secretion through fear or sorrow affords an illustration of the same fact. One secreting surface or gland bearing a functional relation to another gland (for example, kidneys and skin) may, through diminished or increased action, affect that other. Consult Bayliss, 'Principles of General Physiology' (2d ed., 1918).

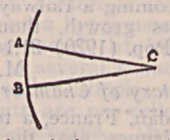
SECTOR (Latin, *seco*, to cut), denotes in geometry that portion of the area of a circle included between two radii and an arc; or, a mixed triangle formed by the radii mentioned and the arc of a circle. Thus *A B C* contained within the radii *C A*, *C B*, and the arc *A B* is a sector of the circle of which the arc *A B* is a portion. The area of a circular sector is equal to the product of the arc of the sector by one-half of the radius. If the angle at the centre is given, the length of the arc of the sector may be found, since it is equal to π multiplied by the radius into the ratio of 180 degrees to the number of degrees of the sector. Thus:—

$S = \pi r \frac{n^{\circ}}{180^{\circ}}$, and $A = \pi r \frac{2n^{\circ}}{360^{\circ}}$,

for the area.

A spherical sector (the one just described is a circular sector) is a volume or solid that may be generated by revolving a circular sector about a straight line drawn through the vertex of the sector as an axis. The arc of the spherical sector generated the surface of a zone called the base of the spherical sector and the two radii generate the surfaces of the two cones, having a common vertex at the centre of the sphere. The *volume* of the spherical sector is equal to the zone which forms its base, multiplied by one-third of the radius of the sector.

Sector is also used as the name of an instrument employed in practical mechanics. It is sometimes called the sectorial scale of equal parts. It is usually a scale of wood, brass or ivory, consisting of two arms which open by turning round a joint or hinge at their common extremity. On each arm there is a diagonal line drawn through the point about which the arms revolve. These are divided into equal parts, which are numbered from the common point outwards.



The sectorial scale is so marked with lines of sines, tangents, secants, chords, etc., as to fit all radii and scales, and is useful in making diagrams: laying down plans, etc. Its principal advantage consists in the facility with which it gives a graphical determination of proportional quantities. It becomes incorrect comparatively, when the opening is great, or the result greater than the data. The sector is founded on the fourth proposition of the sixth book of Euclid, where it is proved that equiangular triangles have their homologous sides proportional.

This instrument is said to have been invented by Guido Uvaldi about 1568, though Gaspar Mordente of Antwerp describing it in 1584, attributes its invention to his brother Fabricius in 1554. It was described by several German and English writers in the same century, and again by Galileo, who claimed to have invented it in 1604. Frenchmen call it the compass of proportion.

Another instrument, used in astronomical observation, is called sector. A limb of this instrument embraces only a portion of a circle used for measuring differences of declination too great for the compass of a micrometer. This instrument was contrived for the purpose of measuring with great accuracy the zenith distances of stars, and when it is so employed it is called a zenith sector. It was by means of the zenith sector that Bradley discovered the existence and magnitude of two very important astronomical elements — the aberration of light, and the nutation of the earth's axis. The instrument has been at times used in trigonometrical surveys for determining the difference of latitude between two stations. For the difference of the zenith distances of the same star, observed at its meridianal passages at two places, gives the difference of the astronomical latitudes of such places without any regard to the star's declination.

There is yet another way in which the word sector is used. It sometimes denotes an arc-shaped attachment to an equatorial mounting often used for communicating the motion of the driving clock to the polar axis. A driving clock, obiter dicta, is a powerful and accurate clock motion used in astronomical and physical investigations to turn an equatorial telescope round its polar axis, so as to hold an object fixed in the field of view; or, for driving a chronograph or other instrument.

SECTS, Religious. See RELIGIOUS SECTS.

SECULAR GAMES, in Roman history, games celebrated at long and irregular intervals, and not, as their name would seem to indicate, once every century. Under the republic they were known as the Tarentine games, from a place in the Campus Martius, called Tarentum, where they were celebrated, and appear to have been instituted about the time of the consul Valerius Publicola. Nothing is known of their origin beyond the fact that they were celebrated in honor of Pluto and Proserpina for the purpose of averting from the state some great calamity. Under Augustus they were revived in 17 B.C. with considerable pomp, occupying three days and nights, and being accompanied by sacrifices to Jupiter, Juno and all the superior deities. For this occasion Horace wrote his 'Carmen Sæculare' in honor of Appollo and Diana, sung by a chorus of youths and virgins. The secular games were celebrated on subsequent occasions, namely, in the reign of Claudius in 47 A.D., in that of Domitian in 88, and in that of Philip in 248, exactly 1,000 years after the building of Rome.

SECULARISM, an ethical system founded on the principles of natural morality and independent of revealed religion or supernaturalism. Its first postulate is freedom of thought — the right of every man to think for himself: this is now admitted, at least in theory, by most Christians; but it was not so when the platform of Secularism was first promulgated about the year 1846 by George Jacob Holyoake in England. Implied in this postulate as its necessary complement is the right to difference of opinion upon all subjects of thought. And this right would be nugatory without the right to assert that difference. Finally, Secularism asserts the right to discuss and debate all vital questions, such as the commonly received opinions regarding the foundations of moral obligation, the existence of God, the immortality of the soul, the authority of conscience, etc. Secularism does not maintain that there is no other good but the good of the present life: with that question it does not meddle: but it does maintain that the good of the present life is a real good, and to seek that is good; and it aims to find "that material condition in which it shall be impossible for man to be deprived or to be poor." In this life there are, it asserts, material agencies which cannot be neglected without folly or hurt, and that it is "wisdom, mercy and duty to attend to them." It does not combat the pretensions of Christianity; does not say there is no light or guidance save in nature; but maintains that "there is light and guidance in secular truth, whose conditions and sanctions exist independently, act independently, and act for ever."

SECULARISTS. See RELIGIOUS SECTS.

SECURITIES. See BANKS AND BANKING—FUNCTIONS OF BANKS, ETC.

SECURITY OF PERSON. See RIGHTS.

SEDALIA, Mo., city, county-seat of Pettis County and the largest city of the central portion of the State, on the Missouri Pacific and Missouri, Kansas and Texas railroads, 189 miles west of Saint Louis and 96 miles east of Kansas City. Sedalia is the terminal point of four divisions of the Missouri Pacific and of three divisions of the Missouri, Kansas and Texas Railroad, including the main lines and branches. The general car and repair shops of the latter road are located at this point, occupying 37 acres of ground, with buildings and machinery costing $160,000 and employing 600 to 800 men. In 1904 the Missouri Pacific Railway Company established at Sedalia its general shops for repairs and construction of cars and locomotives for the entire system at an expense of over a million dollars and calculated for the employment of 2,000 men, the citizens donating $230,000 in money and land as an inducement.

There are numerous manufactories of domestic commodities and several large jobbing and distributing, packing and shipping-houses. There are three national banks, two State banks, and one trust company, with a total capital, surplus and undivided profits of $850,500; deposits, amounting to $5,000,000; also two loan companies. The banks operate a clearing-house for the country banks in surrounding counties, clearings amounting to $1,250,000 per month.

The public buildings include the courthouse, a stone structure, costing $110,000; city hall, market, government building, engine-houses, etc.; Carnegie library, cost $50,000; Y. M. C. A., cost $60,000, 650 members. The public park of 50 acres in city cost $85,000, with swimming pool, tennis court, nice lake for boating, children's playground equipment, large convention hall that has a seating capacity of 1,500. The Missouri State Fair was located in Sedalia in 1901, and $1,000,000 has been spent in buildings and improvements. There are 27 churches and excellent free schools. There are a dozen public school buildings, with furniture, libraries, etc., valued at $350,000; 100 teachers, annual pay roll $57,000. Besides the public schools are two business colleges, one college for colored students, supported by the Methodist Episcopal Church, and several private and parish schools. The high school has a four-years' course and articulates with the State University.

Public utilities are represented by water, gas and electric companies, with a capital of $3,250,000, supplying 2,000,000 gallons of water per day, gas, electric light and power; a street railway company, operating nine miles of street railway, also furnishing electric light and power; a steam heating company, all operating under franchises protecting public and private rights; and two telephone companies. The municipal and school elections are conducted the same as the national and State elections; having the two political parties — Democratic and Republican — each party nominates a candidate for each office. The government is vested in the mayor and board of eight aldermen. Other officers are police judge, clerk, marshal, assessor, collector, treasurer and attorney. The total valuation for taxation in 1915 was $5,733,045, being 40 per cent of cash value. Tax levy for current expense and sinking fund 1 per cent. Total revenue, $105,179.82. Bonded debt $172,000, of which a part bears 4 per cent and the balance 4½ per cent. Prior to 1860 the present site of Sedalia was wild prairie. Foreseeing the building of the Pacific Railway, Gen. George R. Smith, a resident of Pettis County, acquired a tract of land in 1856 and 11 Nov. 1857 filed a plat of the town of Sedalia. The first settlement on the town site was in 1860, the railway reaching the place in January 1861. Owing to the breaking out of the Civil War, the westward advance of the railway was delayed, and Sedalia for several years was the western terminus and an important military post and shipping point for the Southwest. The place was held by the Federal troops throughout the war, save for its capture, after a sharp fight, in October 1864, by the Confederate general, Jeff Thompson, who was driven out the next day by Gen. A. J. Smith. The impetus in growth given to Sedalia during the war was afterward continued by its becoming a railway centre of importance, and its growth, though slow, has been constant. Pop. (1920) 21,144.

M. V. CARROLL,
Secretary of Chamber of Commerce.

SEDAN, sā-dăn, France, a town in the department of Ardennes, near the Belgian frontier, on the Meuse River, opposite Torcy, and about 160 miles northeast of Paris. Its principal buildings are the theatre, public library and college. The town has important cloth manufactures, employing the majority of the inhabitants. Its chief interest is connected with the defeat of the French army by the Germans, and the surrender of Napoleon III with 100,000 soldiers 2 Sept. 1870. Pop. about 22,000. See FRANCO-GERMAN WAR.

SEDAN-CHAIR, so called from Sedan, a town in northern France. A covered chair, cushioned and decorated, used as a vehicle for carrying one person who sits within it, the enclosure being therefore of much greater height than width. It is carried on two poles which pass through rings secured to the sides, usually by two bearers. They were introduced in western Europe in the 16th century, but their use was extended greatly in the 18th century when they were the common means of transportation for ladies and gentlemen in England and France. Similar chairs carried on the shoulders of two or more bearers, have long been in use in China.

SEDDON, James Alexander, American statesman: b. Falmouth, Va., 13 July 1815; d. Goochland County, Va., 19 Aug. 1880. He was graduated from the law school of the University of Virginia and practised law in Richmond. He was a Democratic member of Congress 1845–47 and 1849–51, after which he retired to his estate. In February 1861 he was one of five delegates to the "Peace Congress" at Washington where he maintained the right of a State to peaceful secession. In July 1861 he was a delegate from Virginia to the Confederate provisional Congress, and in November 1862 became Secretary of War in the Confederate Cabinet. This position he held until the Civil War was nearly over, resigning 28 Jan. 1865 and retiring from public life.

SEDDON, Richard John, New Zealand premier: b. Eccleston, Lancashire, England, 1845; d. at sea, 10 June 1906. Emigrating to Australia at 18 he was attracted to New Zealand four years later by the gold discoveries. He sat in the New Zealand Parliament in 1879–81 and 1881–90; later he became minister for defense and public works, commissioner of trades and customs, and finally rose to be premier. By profession he was a mining engineer, and he was an associate of the American Institute of Mining Engineers. He was the body and the soul of the New Zealand government.

SEDGE, a common term indiscriminately applied to the many marshy plants of the family *Cyperaceæ,* and particularly to the genera *Cyperus* and *Carex.* The sedges are grass-like or rush-like herbs with slender stems, generally solid, often triangular, and but rarely swollen at the nodes. The leaves are pointed and narrow (the word "sedge" refers to their cutting edges), with closed sheaths, with or without reduced ligules, and are three-ranked. The flowers are either perfect or otherwise, and are very small, having a hypogynous perianth, generally consisting merely of bristles or scales, with from one to several stamens having slender filaments, and a simple, toothed or cleft style. The fruits are one-celled and are lenticular or three-cornered. The tiny grass-like flowers are gathered into spikelets of one or more, each (or rarely a pair) in the axil of a scale, which may be persistent or deciduous; the spikelets are themselves arranged in various inflorescences, often in conspicuous umbels. The sedges frequent marshy lands, chiefly, and are occasionally useful in binding sea-sands or in contributing to the growth of peat-bogs.

SEDGWICK, Adam, English geologist: b. Dent, Yorkshire, 22 March 1785; d. Cambridge, 27 Jan. 1873. He was graduated at Trinity College, Cambridge, in 1808, became a Fellow there in 1810 and in 1816 was ordained in the Anglican Church. Because of general high ability he was appointed professor of geology at Cambridge in 1818, a chair hitherto something of a sinecure. Sedgwick, however, set at once about acquiring a knowledge of geology that enabled him to raise the chair to one of importance in the university: was one of the founders of the Cambridge Philosophical Society in 1819, through which he greatly assisted the development of the study of natural science; and labored indefatigably to augment the geological collections of the university, often at his personal expense. He continued his duties as a clergyman and made important geological investigations in Wales, Yorkshire, Devonshire, the Lake Country, the Isle of Wight and northern Scotland. He founded the Cambrian and the Devonian systems; but was for long engaged in a controversy with Murchison, whose Lower Silurian system overlapped Sedgwick's Upper Cambrian system. The matter was disputed until the substitution of the term Ordovician after Sedgwick's death. He was president of the Geological Society in 1829–30, and was awarded its Wollaston medal in 1851. He was also awarded the Copley medal of the Royal Society in 1863. As a memorial to him the Sedgwick Museum was opened at Cambridge in 1903. Author of 'Geological Relations and Internal Structure of the Magnesian Limestones' (1828); 'Discourse on the Studies of the University of Cambridge' (1833); 'Synopsis of the Classification of the British Palæozoic Rocks' (1855), etc. With Murchison he wrote 'Physical Structure of the Rocks of Devonshire' (1839).

SEDGWICK, Anne Douglas (MRS. BASIL DE SELINCOURT), American novelist: b. Englewood, N. J., 28 March 1873. She left the United States when a child and has since lived chiefly in Paris and London. She studied painting in Paris but later turned her attention to literature. She was married in 1908. Author of 'The Dull Miss Achinard' (1898); 'The Rescue' (1902); 'Paths of Judgment' (1904); 'A Fountain Sealed' (1907); 'Tante' (1911); 'The Nest' (1912); 'The Encounter' (1914), etc.

SEDGWICK, Arthur George, American lawyer and editor, son of Theodore Sedgwick (1811–59, q.v.): b. New York, 6 Oct. 1844; d. Pittsfield, Mass., 14 July 1915. He was graduated at Harvard University in 1864, entered the Union army as first lieutenant in the 20th Massachusetts regiment in that year, was taken prisoner and held at Libby Prison. He afterward entered the Harvard Law School and was admitted to the bar in 1866. He then practised law at Boston and was engaged with O. W. Holmes, Jr., in editing the *American Law Review* in 1866–72. He practised in New York in 1875–81, and was contributing editor to both the *Evening Post* and the *Nation* until 1905. He was law lecturer at Lowell Institute, Boston, in 1885–86, and was Godkin lecturer at Harvard University in 1909. He was joint author of 'Treatise on the Principle and Practice Governing the Trial of Right to Land' and author of 'Elements of Damages' (1909); 'Democratic Mistakes' (1912).

SEDGWICK, Catharine Maria, American author, daughter of Theodore Sedgwick (1746–1813): b. Stockbridge, Mass., 28 Dec. 1789; d. Roxbury, Mass., 31 July 1867. She was for many years the principal of a famous school for young ladies, and in her day was widely known as an American novelist. Her best-known works are 'A New England Tale' (1822); 'Redwood,' first published anonymously, translated into four European languages, and erroneously attributed to James Fenimore Cooper; 'The Traveller' (1825); 'Hope Leslie, or Early Times in Massachusetts' (1827); and 'The Linwoods' (1835). Consult Dewey, 'Life and Letters of Catherine Sedgwick' (1871).

SEDGWICK, Ellery, American author: b. New York, 27 Feb. 1872. He was graduated at Harvard University in 1894 and taught at Groton School, Massachusetts, 1895–96. He was on the editorial staff of the Worcester *Gazette* 1896 and *The Youth's Companion* 1896–1900; and from 1900–05 was the editor of *Frank Leslie's Popular Monthly.* After a brief connection with *McClure's Magazine* and with Messrs. D. Appleton and Company, he became editor of the *Atlantic Monthly* and president of the company 1909. In 1915 he was elected member of the National Institute of Arts and Letters. He has published 'Life of Thomas Paine' (1899).

SEDGWICK, John, American soldier: b. Cornwall, Conn., 13 Sept. 1813; d. Spottsylvania C. H., Va., 9 May 1864. He was graduated at

West Point in 1837 and served in the army from that time until his death, taking prominent part in three wars and in many engagements against the hostile Indians in the West. During the second Seminole War in Florida 1837–38, he was second lieutenant of artillery, was promoted in 1839, and took part in the Mexican War 1846–47, receiving promotion for gallantry after Churubusco and after Chapultepec. When the Civil War began he became lieutenant-colonel of artillery and rose to the rank of major-general. Stationed first at Washington, he was afterward commander of brigade, then of division in the Army of the Potomac, being placed in command of the Sixth army corps in 1863. He took part in the battle of Fair Oaks, the Seven Days' Battles; was severely wounded at Antietam, and after a leave rejoined the army in time for Chancellorsville and Fredericksburg. He played a distinguished part at Gettysburg, and in 1864 participated in the battles of the Wilderness and Spottsylvania, at which latter place he was shot by a Confederate sharpshooter during a movement of his troops. A bronze statue of him was erected at West Point in 1868. His death forms the subject of a painting by Julian Scott, now in the public library at Plainfield, N. J.

SEDGWICK, Henry Dwight, American lawyer and author, brother of Ellery Sedgwick (q.v.): b. Stockbridge, Mass., 24 Sept. 1861. He was admitted to the bar in 1884 and was engaged in practice in New York in 1885–98. He has since been occupied with literary work. Author of 'Letter of Father Cuellar' (1896); 'Life of Father Hecker' (1897); 'Life of Samuel Champlain' (1901); 'Life of Francis Parkman' (1904); 'The New American Type' (1908); 'Italy in the Thirteenth Century' (1912); 'An Apology for Old Maids' (1917); 'Dante' (1919), etc.

SEDGWICK, Robert, American colonist and soldier: b. Woburn, England, about 1590; died Jamaica, West Indies, 24 May 1656. He emigrated to Charlestown, Mass., in 1635, being one of the first settlers there; in 1638 he assisted in organizing the Ancient and Honourable Artillery Company of Boston (having received his training in the Artillery Company of London), and two years later became its captain. He rose to the command of the militia, in 1652. With John Winthrop, Jr., he helped establish, in 1643, the first iron works of the United States. Under Cromwell's orders he captured several French ports in the Penobscot region and in 1655 assisted in the capture of Jamaica. Cromwell raised him to the rank of major-general and made him governor of that island.

SEDGWICK, Theodore, American jurist and legislator: b. Hartford, Conn., May 1746; d. Boston, 24 Jan. 1813. He studied at Yale, was admitted to the bar in 1766, began practice at Great Barrington, Mass., and soon removed to Sheffield, where he attained eminence in professional and civil affairs, frequently representing the town in the Massachusetts legislature. At the beginning of the Revolution he entered the Continental army, serving on Gen. John Thomas' staff in the expedition to Canada, and later acting unofficially as commissary. In 1785–86 he was in the Continental Congress, and in the winter of 1787 was prominent in the suppression of Shays' rebellion (q.v.). He was speaker of the State house of representatives in 1788, and in that year also a member of the State convention for the ratification of the Federal Constitution; from 1789 to 1796 a representative in Congress; and in 1797–99 United States senator, being president pro tem. in 1797. Then he was again in the House, and its speaker until 1801. From 1802 until his death he was a justice of the Supreme Court of Massachusetts, being noted on the bench for the clearness of his opinions. He was one of council who secured a decision (1780) by which such a construction was given to the constitution of Massachusetts as to abolish slavery in that State. He was an active Federalist, and a member of the American Academy of Arts and Sciences.

SEDGWICK, Theodore, American author, son of Theodore Sedgwick (q.v.): b. Albany, N. Y., 27 Jan. 1811; d. Stockbridge, Mass., 9 Dec. 1859. He was graduated at Columbia College in 1829, and was admitted to the bar in 1833. He was attache at the United States legation at Paris in 1833–34, and afterward practised law in New York until 1850. From 1858 until his death he was United States district attorney of the southern district of New York. Author of 'Memoir of William Livingston' (1833); 'What is Monopoly?' (1835); 'Treatise on the Rules Which Govern the Interpretation and Practise of Statutory and Constitutional Law' (1857; 2d ed., 1874), etc. He edited the political writings of William Leggett (2 vols., 1840).

SEDGWICK, William Thompson, American biologist: b. West Hartford, Conn., 29 Dec. 1855; d. 26 Jan. 1921. He was graduated from the Sheffield Scientific School of Yale University in 1877 and later studied at Johns Hopkins University. He was an instructor at the former 1878–79; was at Johns Hopkins as a Fellow in biology 1879–80; as instructor and associate professor of biology at the latter also 1880–83. After 1883 he was professor of biology in the Massachusetts Institute of Technology. He was biologist for the Massachusetts State Board of Health 1888–96. He is a joint author of 'General Biology' (1886); and published 'The Principles of Sanitary Science and Public Health' (1902); 'The Human Mechanism' (1906).

SEDILIA, *in architecture,* originally the rows of seats in a Roman amphitheatre. Later applied to the stone seats on the south side of the altar in Roman Catholic churches; used by the priest, deacon and sub-deacon in the intervals of the church service. In cathedrals a row of such seats is provided for the clergy.

SEDIMENTARY ROCKS, as originally applied, a term used to indicate those deposits or sediments laid down by water, as contrasted with those rocks which have solidified from a fluid condition and known as igneous. The term has been somewhat expanded in recent usage, to include also the deposits formed by wind and those made by glaciers. They may be divided on the one hand into those laid down in the sea (marine), and those formed on land (terrestrial or continental). On another basis they are divided into aqueous, eolian and glacial. On still another basis they may be considered as of mechanical, chemical or organic origin. The most familiar types are consolidated gravels, conglomerates; consolidated sands, sandstones; consolidated clay, shales; and consolidated marls or lime oozes, limestones. For a more detailed account of these rocks and the methods by which they are formed, see SHALE, SANDSTONE, and the section on *Sedimentary Rocks* in the article on ROCKS.

SEDITION, an offense short of treason but more serious than ordinary breach of the peace, or conduct tending thereto. Sedition, as a distinct offense, is unknown to English law, and is also unknown to United States laws, save in acts of Congress relating to the army and navy, and there it evidently means a mutiny or uprising against superior authority, for it is provided that a soldier joining any sedition, or who being present at a sedition does not do his utmost to suppress the same, shall be punished with death, while a sailor uttering seditious words can be punished at the discretion of a court-martial. State laws relating to sedition treat it as a minor offense, to be punished when it amounts to an actual attempt, whether in speaking or writing, or by actual violence, to agitate the overthrow, by unlawful means, of established authority. Anarchist meetings are within this description; when they lead to riot and murder, moreover, as in the case of the Haymarket Riot, in Chicago, the offense is more serious, and all parties concerned are held as principals or accessories to the crimes which result directly from their course of action.

The Alien and Sedition laws enacted by Congress in 1798 embodied an extension of the meaning of sedition which the majority of the American people evidently did not approve, and were aimed at freedom of speech and of the press. The motive for these laws was the suppression of the revolutionary tendencies excited by the French Revolution, the Republican (afterward called the Democratic) party sympathizing with the Revolution, and the Federalists being adverse at least to the extreme phases of that great convulsion. Several prosecutions under the Sedition Law served to make it more odious, and the consequence was the retirement of the Federalist party from power, and the election of Thomas Jefferson to be President of the United States. Since that time, except during the late Civil War, no attempt has been made to interpret as sedition the editorial utterances of the press regarding current events. See ALIEN AND SEDITION ACTS.

SEDITION LAWS. See ALIEN AND SEDITION ACTS.

SEDLEY, sĕd'lĭ, SIR **Charles,** English poet, dramatist and wit: b. Aylesford, Kent, 1639; d. 20 Aug. 1701. He was educated at Oxford, but did not graduate. He wrote comedies and songs; of the latter one or two are still popular, but the former are unequal to his reputation. His first comedy, 'The Mulberry Garden,' partly founded on Molière's 'École des Maris,' was published in 1668; and among his other works of this class are 'Bellamira or The Mistress' (1687), based on the 'Eunuchus of Terence,' and 'The Grumbler.' In later life he entered Parliament and took an active part in politics, uniformly opposing the unconstitutional policy of James II, and was one of the chief promoters of the Revolution.

SEDRAT, the name given in the religious lore of the Mohammedans to the lotus tree, standing on the right-hand side of the invisible throne of Ali, with two rivers running from its roots. Its boughs extend farther than the distance between heaven and earth, while numberless birds sing among them, and countless angels rest beneath their shade.

SEDUCTION, *in law,* the act of wrongfully persuading a woman, as by promise of marriage, to surrender her chastity. The theory of this offense in English law is that it is not against the seduced person but against the parent or person standing in that relation, who may sue for damages for actual loss of services caused by such seduction. If this be proved, he can recover not only any pecuniary loss he may have sustained but also compensation for injury to his feelings and damages by way of punishment of the offender. Very slight evidence of service is sufficient to establish the relation of master and servant and to fix the defendant's liability. The action is usually brought by the father, but it may be brought by any person who stands in the relation of master to the seduced person. Usually the woman cannot sue in her own name, but in Scots law she may do so if the deceit of the defendant has been the sole cause of the injury. The action, as a rule, can be brought only in behalf of an unmarried woman, the seduction of a wife being known as criminal conversation, but in England it was formerly held that an action might be brought by the father of a married woman living in his house separated from her husband and giving even the slightest services to her parent. By statute, however, the husband can now demand damages in a suit for divorce where the seducer is corespondent. While the rule in England is that the parent cannot sue if the daughter is not performing at least slight services for him, this has been modified in the United States to the extent that the parent may bring action if he is entitled to her services during minority, whether she is in his service or not. Statutes in the United States have greatly modified the old common-law rule. For instance, seduction was not a crime at common law, but in many of the States it has been made so by statute if the woman seduced was previously chaste, particularly when accompanied by a promise of marriage. Likewise in some States the seduced woman may bring the action in her own name and may have both a criminal and a civil remedy.

SEDUM, a genus of plants of the family *Crassulaceæ,* the many species of which inhabit chiefly the north temperate and Arctic zones. They have succulent, generally smooth foliage, of varying form, but often crowded on the stems, and four or five parted flowers, with distinct petals, usually in cymose inflorescences and of pink or yellowish hue. The carpels of the fruit are separate or united at the base. The sedums are pre-eminently useful for rock-gardens, and for cultivation in plots or in poor soil, since they are remarkably hardy under adverse conditions. Some prefer barren rocks, and spread luxuriantly over them, thus earning their common name of stone-crop. Like the house leeks (*Sempervivum*), which they closely resemble, they are easily propagated by seeds

or offshoots, and are possessed of great vitality. *S. telephium* is the orpine (q.v.), a live-for-ever, or live-long, so called because a cut branch, fastened out of doors, will grow, and perhaps bloom, drawing upon the store of reserve tissue in its fleshy bulk, and since it will occasionally start into growth when pressed and dried it is also called Aaron's rod. This species was further known as Midsummer men, as it was used for love-charms on midsummer's night, two stems of it being set up to see if one, representing a lover, would turn to the other. *S. acre,* the English wall-pepper, is a common creeping plant covered with yellow, star-like flowers, fond of sunny, rocky places, and is an emetic and cathartic. One of the handsomest species is the old-fashioned border plant, *S. spectabile,* with upright stems and broad cymes of purplish flowers. *S. telephioides* and *S. roseum,* the rose-root or rhodia of old time shops, with rose-scented roots, make themselves conspicuous by growing in great masses on mountain ledges. *S. album* was formerly used as a medicine, and cooked or eaten as a salad under the name of worm grass or prickmadam.

SEE, Horace, American naval engineer: b. Philadelphia, 17 July 1835; d. 1909. He received his training as a mechanical engineer in a machine shop. As superintendent engineer of the firm of William Cramp and Sons he was identified with its fame as the builder of high-class ships. He is known as the inventor of the hydropneumatic ash ejector, the cylindrical mandrel for face bearings and other important mechanical devices. He was consulting engineer and naval architect for several noted corporations in the United States.

SEE, Sir John, Prime Minister of New South Wales: b. Felling, Huntingdonshire, England, 1844; d. 1907. In 1853 he went to Australia, and in 1880 was elected member of the colonial Parliament, to which he was re-elected several times as member for Grafton until 1904. In 1885 he was appointed Postmaster-general and from 1891 to 1894 was Treasurer. In 1899–1901 he held the portfolio of Chief Secretary and Minister of Defense, and from 1901 to 1904 was Prime Minister. In 1902 he was knighted. Ill health compelled his retirement in 1904.

SEE, Thomas Jefferson Jackson, American astronomer and mathematician: b. on a farm near Montgomery City, Mo., 19 Feb. 1866. In 1884 he entered the University of Missouri and was graduated (A.B., L.B., S.B.) at the head of his class in 1889, with the Missouri astronomical medal for an original thesis on the 'Origin of Binary Stars.' He at once entered the University of Berlin, for post-graduate study, and won with high honors the degrees of A.M., Ph.D., 10 Dec. 1892 Upon returning to America 25 Dec. 1892, he organized and had charge of the department of astronomy at the University of Chicago, and aided in establishing the Yerkes Observatory, 1894. In 1896 Dr. See entered upon a survey of southern double stars and nebulæ for the Lowell Observatory. During two years at Flagstaff, Ariz., and at the City of Mexico, he examined with a 24-inch telescope some 200,000 fixed stars, between 15 and 65 degrees south declination, and discovered some 600 new double stars, besides measuring about 1,400 stellar systems previously reorganized by Sir John Herschel and other observers. Dr. See lectured on Sidereal Astronomy at Lowell Institute, Boston, in December-January, 1898–99, and was immediately afterwards appointed professor of mathematics, United States Navy, by President McKinley. On duty at the Naval Observatory, Washington, 1899–1902, with 26-inch telescope, he observed double stars and satellites, and measured the planets and satellites by daylight and at night, thus deducing the absolute diameters and constants of irradiation of the chief bodies of the solar system. On duty at the Naval Academy, 1902–03; since in charge of the Naval Observatory, Mare Island, Cal. During 1902–03, he investigated the position of Laplace's «Invariable Plane of the Solar System»; and during 1904–06 carried out important researches on the moments of inertia, internal densities, pressures, temperatures and rigidities of the heavenly bodies, earthquakes, etc. He has made numerous other researches in regard to the origin of the solar system, the cause of the land and water hemispheres of the terrestrial globe, gravitation, etc.

He has published 'Die Entwickelung der Doppelstern-Systeme' (Berlin 1893); 'Researches on the Evolution of the Stellar Systems' (Vol. I, Lynn 1896); Vol. II, 'Capture Theory of Cosmical Evolution' (1910); 'Researches on the Physics of the Earth' (in Proc. Am. Philos. Soc. 1906–13); 'Dynamical Theory of the Globular Clusters' (in Proc. Am. Philos. Soc., 1912); 'Electrodynamic Theory of Magnetism and of Universal Gravitation: Discovery of the Cause of Gravitation, with proof that this fundamental force of nature is propagated with the velocity of light' (communicated to the Royal Society of London, by Lord Rayleigh, Feb. 1915); 'Determination of The Physical Cause which has established the Unsymmetrical Equilibrium of the Solid Nucleus in the Fluid Envelope and thereby produced the well-defined land and water hemispheres of the Terrestrial Spheroid' (in 202d volume of the *Astrom. Nachr.,* Kiel, January 1916).

SEE, a word applied to the seat or throne of a bishop, but more usually employed as the designation of the city in which a bishop has his residence, and frequently as that of the jurisdiction of a bishop, that is, as the equivalent of diocese. The Holy See is located in Rome.

By universal usage, see designates the city (thence, at least in popular language, the entire diocese) in which the seat of the bishop is placed. Sees have, as a rule, been in some city, or considerable town, and in general the name of a see is taken not from the district governed by the bishop but from the city or town. To this usage, the names of most of the Protestant Episcopal sees in America are an exception. Sees *In Partibus Infidelium* were those which retained their ancient names, though in many cases not merely the cities themselves, but even all traces of the Christian religion, in the sites on which they anciently stood, have disappeared. In the Roman Catholic Church, the Pope alone establishes sees, and alters their distribution and their local limits and boundaries; though these changes are not made except in extreme cases (e.g., the French Revolution) without consent of the actual bishop. In the Church of England, all changes in dioceses, their limits, boundaries, etc., are done by authority of Parliament. In America the General Convention of the Protestant Episcopal Church creates new sees and changes limits of diocese. See Diocese.

SÉE, a river of France in the department of La Manche. It waters the arrondissement of Avranches and flows into the bay of Mont Saint Michel, which until the great tidal wave of the year 709 was a forested area 60,000 acres in extent. Equinoctial tides sometimes reach a vertical height of 50 feet at the river's mouth.

SEE-ADDER, an English name for a marine Stickleback, one of a group of small fishes (*Gastrosteus*) common in the coasts of the north temperate zone. The European varieties are found in certain districts in brackish water. Most species are well proportioned, the marine varieties being a trifle elongated. The mouth is moderately wide. The teeth are small but firmly set. A hard bony covering protects the head. There are no scales on any part of the body, but a set of shields or scutes protect the sides. The first dorsal and the ventral fins carry pointed spines. There are wide variations, however, between the several species and even within a species in regard to the degree of this armature. The sea-stickleback reaches a length of seven inches and has 15 spines on the back. It is never found in large schools. The stickleback is a short-lived animal, reaching an age of only three or four years. When the warm season approaches each male selects or appropriates a certain territory to himself and defends it against all comers especially against members of his own species and sex.

SEEBACH, Marie, German actress: b. Riga, 1834; d. 3 Aug. 1897. Her father was an actor and placed her at Cologne to prepare to become an operatic star. She held very many successful engagements and a number of starring tours and in 1887 was called to the Theatre Royal in Berlin. Her favorite rôle was Gretchen, but she was also very successful as Klärchen in 'Egmont,' Julia, Ophelia, Jane Eyre, Desdemona, Lady Macbeth, Maria Stuart, the nurse in 'Romeo and Juliet' and Louise in 'Kabale und Liebe.' She paid a visit to the United States in 1871 and gave there about 160 performances in 17 cities. The Marie Seebach Stiftung, a home for the poor of her profession, was endowed by her at Weimar in 1895. Consult Gensichen, 'Aus Marie Seebachs Leben' (Berlin 1900).

SEEBERG, Reinhold, German Lutheran theologian: b. Pörrafer, Livonia, 1859. In 1878–82 he studied at the University of Dorpat, and in 1882–84 at the University of Erlangen. In 1885–89 Dr. Seeberg was successively privatdocent, assistant professor and university preacher at the University of Dorpat. From 1889 to 1894 he was professor of Church history and of New Testament exegesis at the University of Erlangen, and from 1894 to 1898 held also the chair of systematic theology there. In 1898 he became professor of systematic theology at the University of Berlin. He is the author of several works on the history of dogma and on the relations of the Church to the social life of the time, all of which are highly esteemed. The chief of these are 'Der Begriff der christlichen Kirche' (1885); 'Lehrbuch der Dogmengeschichte' (2 vols., 1895–98; 2d ed., 3 vols., 1907–13); 'Die Kirche und die soziale Frage' (1897); 'Grundriss der Dogmengeschichte' (1901; 3d ed., 1910); 'An der Schwelle des zwanzigsten Jahrhunderts' (1901; 5th ed., 'Die Kirche Deutschlands im 19. Jahrhundert,' 1904); 'Die Grundwahrheiten der christlichen Religion' (1902; 5th ed., 1910; English translation 'The Fundamental Truths of the Christian Religion,' 1908); 'Das Abendmahl im Neuen Testament' (1905; 2d ed., 1908); 'Aus Religion und Geschichte' (2 vols., 1906–08); 'Die kirchliche soziale Idee' (1907); 'Offenbarung und Inspiration' (1908; English translation 'Revelation and Inspiration' 1910); 'Sinnlichkeit und Sittlichkeit' (1909); 'Alte und neue Moral' (1910); 'System der Ethnik' (1911); 'Vom Sinn der Geschichte' (1913).

SEEBOHM, sē'bōm, **Frederic,** English economic historian: b. 1833; d. 1912. He was educated at Edinburgh and at Cambridge. In 1856 he became a barrister of the Middle Temple, but devoted much of his attention to the study of the social organization of the Saxon, Celtic and early English tribes, and has published 'The English Village Community' (1883–90); 'Tribal Custom in Anglo-Saxon Law' (1902); 'Tribal System of Wales' (1895); 'The Oxford Reformers: Colet, Erasmus and More'; 'The Era of the Protestant Reformation'; 'Customary Acres and their Historical Importance (posthumous, 1914).

SEED PLANTS, plants of the highest branch of the vegetable kingdom, characterized by producing seeds (q.v.) as a result of the fertilization of their egg-cells, and called *Spermatophyta,* formerly known as the *Anthophyta,* and *Phanerogamia.* The first of these names is to be preferred, since it means «seed plants.» The second which means «flowering plants» is less applicable, since in many plants, as the gymnosperms, there is properly no flower; and the third, meaning «visible marriage,» is quite inapplicable, since the act of fertilization is very difficult to observe. There are more than 100,000 known kinds of seed plants, divided into two classes, namely: *Gymnosperms,* with naked seeds, and *Angiosperms,* with seeds enclosed in dry pods or fleshy fruits. The former, of which there are less than 500 kinds, include the pines, spruces, firs, cedars, cypresses, etc., while the latter include the lilies, grasses, orchids, buttercups, pinks, mints, roses, beans, parsleys, sunflowers and thistles. The Angiosperms are properly the «flowering plants,» in which alone the organs of the flower are fully developed. For the families of seed-plants see Vegetable Kingdom.

SEED TESTING, the determination of the purity and the viability of seed by natural or artificial means. The purity of seed embraces not only the idea of freedom from weed seeds, seeds of nearly related species, and such things as chaff, bits of stem, dirt, etc., but it also includes the idea of «trueness to type," or «purity of stock,» as the seedsmen term it. This last, however, is generally a matter of seed-growing, the grower being held responsible for the ejection of «rogues,» or plants which differ

from the particular variety in hand. In some cases, for instance with certain varieties of peas, the rogues may be removed by sieves where they are smaller or larger than the type, or by hand-picking where the color as in certain beans indicates a difference. Winnowing is also useful in various cases. The presence of rogues always lowers the value of the sample and careful seedgrowers and reputable seedsmen exercise constant vigilance in this respect. It is impossible, however, except with certain species or varieties, to recognize rogues by their seeds. Occasionally rogues are superior to the remainder of the crop; in such cases, when observed in time they may become important varieties, after due selection and growing by themselves for several years. For the satisfactory testing of purity of stock, samples of seed are grown in the field together with samples known to be pure and due comparisons are made, the conditions of soil, season, etc., being as nearly identical as possible. Trueness to type is far more important to the customer than either freedom from most impurities or a high per cent of germinable seeds, because the impurities can frequently be removed and deficiencies in germination may be adjusted by heavier sowings. Many specialists both in Europe and in America have devoted much time and study to the purity of seed; that is, the freedom from weed seed. Among their popular methods the following are most frequently used. Samples of equal weight are taken from various parts of the bulk and after thorough mixing a sample of this composite is taken. This is weighed and spread upon white paper or glass, and the impurities are picked out by means of forceps, each kind of impurity being placed by itself. Any seed not of the kind examined constitutes an impurity; that is, radish seed would be an impurity in cabbage samples. Each kind of impurity is then weighed and its percentage determined. These percentages vary considerably with the different kinds of plants, cereal and most vegetable seeds being grown under clean cultural methods, and being generally easy to clean, should be nearly if not fully 100 per cent pure; whereas clovers and grasses, being grown without such cultural care, and being much harder to clean without considerable loss of good seed, may often have as much as 25 per cent of impurities. These percentages have been tabulated both in Europe and in America, and form a basis by which the experiment stations of both continents judge samples sent in for inspection. The next operation is the determination of the character of the impurities. If these consist of useful seeds they may not seriously affect the value of the sample; but if noxious weeds are present the sample is condemned, and if 1 per cent or more of ordinary weed seeds is found many specialists condemn the sample. The presence of Canada thistle, cockle, dodder, wild mustard, chess, wildoats, Russian thistle, or of the bulbs of wild onion or garlic, even in small quantities, is generally sufficient to condemn the sample. These may all be seen with a hand-lens or even, in some cases, with the unassisted eye.

Germination tests are conducted either in soil under glass, out of doors, or in specially constructed germinators, some of which are rather elaborate in order to maintain particular conditions during the test. These devices are seldom used except in the botanical laboratories of agricultural experiment stations. Many of the leading seedsmen devote some of their greenhouse space to the testing of seeds for viability. Their methods are about as follows: The samples are taken in various ways; but frequently the operator estimates the percentage that from his experience he feels sure will not grow. Then he picks out 100 or 200 seeds that he thinks will germinate and plants them. Upon the basis of the estimate and the actual behavior of the sample planted, he figures the approximate value of the seed. When greenhouses are not available seeds are often sprouted between sheets of damp blotting paper, upon porous saucers plaster of paris dishes, etc.—methods of value also for the home testing of seeds. Temperatures favorable to the germination of each kind of seed must be maintained; these range from about 45 degrees to 80 degrees or even more. Oat seed will germinate upon melting ice. Moisture and an adequate supply of air must also be given and daily inspection and the removal of the sprouted seeds are essential. Some seeds germinate in a few hours; others require weeks.

Otherwise seed-testing is more interesting than useful, and it has not the all-importance formerly attributed to it, because. under existing conditions, arbitrary standards can rarely be established, because systematic inspection would be too cumbersome and costly, and because the reputable seedsmen are on the alert to keep their stock up to the highest practical grade without other inspection than that they exercise themselves. With them the price of seed is usually a rather safe index of purity, viability, etc., the higher price, other conditions being equal, indicating the superior quality. Such should be given the preference, especially with grass and clover seeds and such other seeds as are difficult to clean.

For interesting tables, details of methods, descriptions of apparatus, etc., consult various publications of the Division of Botany, and the 'Year Books' of the Department of Agriculture; also an epitome of these in the 'Cyclopedia of American Horticulture' (New York 1900-02).

SEEDS, the fertilized ovule of a phanerogamic plant, containing the embyro of a new plant like the parent and its food supply. Only one class of plants, the spermaphytes, develop true seeds. This class is subdivided according to the character of the ovules — whether naked and fertilized by pollen lying directly upon them (Gymnosperms), or enclosed in a pericarp, and fertilized through the medium of a stigma and the style (Angiosperms). The simple seed or seeds and the surrounding pericarp, formed by structural changes in the persistent parts of the flower or stalk, constitute the fruit. Often a one-celled indehiscent fruit containing a seed is mistaken for the seed itself.

The essential parts of a seed are developed from those of the ovule. They are the nucleus or embryo, and its food supply, and at least one, but nearly always two integuments, although assuming different positions in the seed. The embryo is generally visible as a distinct differentiation in the seed tissues, and one, two or several leaves may be seen issuing from the short axis or stem portion of the embryo called the hypocotyl. These are the seed leaves or cotyledons. The number of cotyledons in Gymnosperms may vary from two to several; in Angiosperms, the embyro has either one or two, and this characteristic is so constant, that this class is further divided into monocotyledons or dicotyledons, according to the appearance of the seedling with one or two seed-leaves. The hypocotyl, often clasped between the cotyledons, bears at one end a mass of tissue called the plumule, where two tiny leaflets (in dicotyledonous seeds) may sometimes be discerned, and at the other end another mass called the radicle. Very often nutritive tissue is formed between the embryo and the seed-coats, and may be hard or horny. This reserve tissue, or albumen, as it is called, when derived from the nucellus is called perisperm, but when developed within the embyro-sac is the endosperm. The embyro itself, when this external nutriment is absent, is filled with an accumulation of reserve material, especially in the cotyledons.

When started into growth by the proper conditions of heat, oxygen and moisture the embryo liberates itself in many ways. In some monocotyledons, where the nutriment is stored outside of the embryo, the one seed leaf is provided with absorbent cells at its apex and is connected with the cells of the reserve tissue at that point, transferring the sustenance to the young embryo. Among the dicotyledons in such seeds as the gourd, the radicle pushes out through an aperture in the seed-coat, and fastens itself in the ground with lateral rootlets. It carries out one end of the hypocotyl with it, but cannot disengage the other, clasped between the cotyledons in their tightly fitting case, until the hypocotyl, arching itself in the effort to grow upward toward the light, finally exerts such a strain that the seed-case is ruptured, and the seed-leaves are pulled out. Then the hypocotyl straightens up and the two cotyledons turn green and act as foliage leaves. Often split acorns are found lying on the ground in early spring, anchored by a fleshy white thread. The embryonic leaves nearly fill the seed-coats, and are thick, swollen and tense, clasping the hypocotyl. The acorns take up water from their environment, the embryo begins to grow, the seed-coats burst at one end, and the radicle, the hypocotyl and the thick stalks of the cotyledons are extended. The radicle turns downward into the soil, producing root-hairs, and the plumule, extricating itself from the clasp of the seed-leaves, starts upward, but the cotyledons themselves remain in the coats of the acorn, and gradually give up all their store of nourishment to the embryo and dwindle away. In the mangroves, the whole process of germination takes place while the seed is still on the tree, and the embryo itself tumbles into the mud with such force that it remains in position to continue growth.

The seed-coats are variously constructed, the inner usually a papery colorless membrane, or of a mucilaginous, easily-swelling nature; the outer one, the "testa," while sometimes of other hues, is more often brown, gray or black. The testa is usually made of several layers of cells, each of which may be differently fashioned; but often provision is made for the extrusion of the embryo, and the hilum, or place of attachment, shows on the smooth or rough surface. Another growth is occasionally developed from the base of the seed as it matures. This is either very small mere fleshy ridges or bumps surrounding the base, and then called a caruncle, which often becomes a specific character as in the *Polygalaceæ;* or entirely or partially encloses the seed, being then known as an aril, as in the orange investments of the spindle tree and the mace.

There are innumerable variations of the outer coats adapted to their needs of seed dispersion, protection and germination. Some seeds, like those of the quince, are enveloped in an adhesive mucilage which serves to cement them to the soil, so that the embryo may have a chance to strike into it. Certain smooth or polished seeds, when moistened, are capable of developing a similar mucilage either from the whole surface or from special groups of cells. In such cases as that of the squirting cucumber, which violently ejects sticky seeds, the mucilage not only secures the seed to the ground, but to any animal that chances to touch one, and they are therefore carried to some distance. Birds are fond of the viscid mistletoe berries and often carry the seeds away on their beaks, wiping them off on a convenient branch, to which they stick and start growth.

Plants native to loamy soils are likely to have seeds with irregular integuments, pitted and reticulated with delicate ridges which suffice to fix them in the earth, and others have developed spines for further anchorage. Others have growths of hairs, which in riverside willows, for instance, adhere to mud, or in the Spanish moss, become entangled in the roughnesses of the bark. The growth of hair upon a seed, however, is of more general use in the dispersion of the species. The cotton seed has a hairy investment which keeps it afloat in the wind, and the tufts of hair on fireweed and milkweed are familiar sights, sailing along in autumn and spreading these weeds far and wide. Some seeds instead of hairs, develop wings, as those of the cinchona and pine Orchids have seeds so light and small that they drift away like dust.

Aquatic plants have seeds curiously adapted for dispersion by water. Nymphæa seeds are loosely enveloped in an aril, leaving an air chamber between it and the outer seed-coat, and the seeds therefore float and are driven about by the wind. Many smaller water plant seeds manage to keep afloat, and sometimes become entangled in the feathers of water fowl, to be transferred to other bodies of water. Very many seeds have extremely hard shells, and are practically impermeable to water like those sea-beans (q.v.) which come ashore on the sea coasts, having traveled over seas. Some of these hard-shelled seeds are transferred from place to place by birds and animals which eat their pericarps and eject the seeds uninjured. The vitality of certain varieties of seeds is extraordinary, some of them retaining their powers of germination for 20 to 30 years.

SEELER, Edgar Viguers, American architect: b. Philadelphia, Pa., 18 Nov. 1867. He was graduated from the Philadelphia Central High School in 1884, entered an architect's office, and later studied architecture at the Massachusetts Institute of Technology, and the École des Beaux Arts, Paris, where he was for three years under Victor Laloux. He returned

to America in 1893 to accept the assistant professorship of design in the architectural department of the University of Pennsylvania, began independent practice in 1895, but in 1898 withdrew from teaching, though remaining staff lecturer and adviser in the architectural department. Among important buildings designed and erected by him are the Astronomical Observatory and the Dental Laboratory of the University of Pennsylvania; the Winona Free Public Library, Minnesota (with W. P. Laird); the Real Estate Trust Company's office building, Philadelphia; the First Baptist Church, Philadelphia, and the James V. Brown Memorial Library, Williamsport, Pa., as well as many city and country residences. He was elected a Fellow of the American Institute of Architects in 1900, and a member of the faculty of the Pennsylvania Academy of the Fine Arts in 1902.

SEELEY, sē'lĭ, Sir **John Robert,** English historian and essayist: b. London, 10 Sept. 1834; d. Cambridge, 13 Jan. 1895. He was graduated from Christ's College, Cambridge, in 1857; was elected Fellow and made classical lecturer there. He published (under the pseudonym «John Robertson») a book of poems (1859); was appointed in 1863 professor of Latin in University College, London, where he continued until 1866; and in 1865 published 'Ecce Homo,' in many respects the best, and certainly the best-known, of his works. It was a simple account of the life and teaching of Christ, dealing with these, however, as the title indicates, wholly from the human side. Owing to its title and the limited scope of the volume, the author was held to deny by implication certain doctrines, a consideration of which he had purposely omitted. There followed a discussion in which Newman, Gladstone and Stanley were numbered among the participants. In a later edition Seeley in a preface guarded himself against misconception. He was professor of modern history at Cambridge in 1869–95. Further publicationc of his are 'Natural Religion' (1882); 'The Expansion of England' (1883), a popular narrative from the imperial viewpoint; 'The Growth of British Policy' (1895); and 'The Life and Times of Stein' (1878), his chief contribution to historical knowledge.

SEELYE, sē'lĭ, **Julius Hawley,** American college president: b. Bethel Conn., 14 Sept. 1824; d. Amherst, Mass., 12 May 1895. He was graduated from Amherst in 1849, and afterward studied theology at the Auburn Theological Seminary and at the University of Halle. From 1853 to 1858 he was pastor of the First Reformed Dutch Church of Schenectady, N. Y., from which charge he was called to the presidency of Amherst College. He was a member of the 44th Congress from Massachusetts, and was later engaged in the revision of the tax laws of that State. His writings include 'The Way, the Truth, and the Life' (1873); 'Christian Missions' (1875; 'Empirical Psychology' (1882); 'Citizenship: a Book for Classes in Government and Law' (1894).

SEELYE, Laurenus Clark, American college president, brother of J. H. Seeley (q.v.): b. Bethel, Conn., 20 Sept. 1837. He was graduated at Union College in 1857 and during the next six years he was engaged in theological study at Andover, Mass., Heidelberg and Berlin. After a brief pastorate in the Congregational denomination at Springfield, Mass., he accepted a call to the chair of English literature at Amherst in 1865, and in 1873 became the president of Smith College. In 1910 he was made president-emeritus. His best known books are 'The Antiquity of Celtic Literature' (1870); 'Our Celtic Inheritance' (1870); 'The Ancient Fenians' (1871); and 'The Higher Education of Women: its Perils and its Benefits' (1888); also various articles and addresses on educational and religious topics.

SEER, sēr, a weight in India, formerly varying in different parts of the country, but by an act of the Anglo-Indian government 31 Oct. 1871 adopted as the primary standard of weight, and made equivalent to a kilogram.

SEFATIANS. See Mohammedanism.

SEGAN-FU, sē-găn'foo, **China.** See Singan-fu.

SEGANTINI, Giovanni, Italian artist, 'the painter of the Alps': b. Arco, Trentino, 15 June 1858; d. Maloja, Oct. 1899. Bred in poverty, his mother dead, and abandoned by his father; before his teens herding flocks in the hills to earn a living, he amused himself by sketching surrounding scenes. His drawings becoming known, after further vicissitudes, he at length studied at the Brera Academy, Milan, while supporting himself by portrait painting and art tuition. His first pictures 'The Choir of San Antonio,' 'The Ship,' 'The Falconer,' and 'The Dead Hero,' showed his improving quality, and in 1882 he settled near Lake Como at Brianza, where he painted the 'Ave Maria,' which was awarded the gold medal at the Amsterdam exhibition (1883). This was followed by 'Mothers,' 'A Kiss,' 'Moonlight Effect,' and 'After a Storm in the Alps.' In 1886 he removed to Val d'Albola, 5,000 feet above sea-level in the Swiss Alpine Engadine, and influenced by Millet's vogue, sought his subjects in the lives of the lowly agriculturists of the region. 'The Drinking Place' won the gold medal in Paris in 1899; 'Ploughing in the Engadine,' now in the Munich Pinakothek, won the gold medal at Turin, 1892; 'At the Tether,' 'In the Sheep-fold,' 'Dark Hours,' 'By the Spinning Wheel,' 'Return to the Old Home' are also of this period, as well as 'Midday on the Alps' and 'Winter at Savognino.' As if premonitory of his all too early death he developed a moralizing and mystical vein which is shown in 'Sorrow finding Comfort in Faith' painted in 1896, now in the Hamburg Gallery; 'Unnatural Mothers' in the Vienna Gallery; 'Punishment of Luxury' in the Walker Gallery, Liverpool; 'Angel of Life' in the Budapest Gallery; 'The Massacre of the Innocents,' 'Divine Youth' and the 'Annunciation.' Segantini is ranked as the greatest of modern Italian artists. At Saint Moritz is the Segantini Museum, where many of his pictures are exhibited, including his unfinished 'Panorama of the Alpine World,' intended for the Paris Exhibition. Consult monographs by Montandon (Bielefeld 1904); Ritter (Paris 1898); Segantini (Munich 1913); Servaes (Vienna 1902); Sizeranne (Paris 1899); Villari (London 1901).

SEGAR. See Cigar.

SEGESTA, sē-jĕs'tą (Gr. *Egesta*), Sicily, the northwestern extremity of the island, lies 11 miles from Castellamare (q.v), its port. Its interest is wholly historical, as the site is now unoccupied. Segesta was built upon a steep mountain, now known as Monte Varvaro, on the river called at present 'Fiume Gággera. It formed an alliance with Athens in 416 B.C., and in 413 with the Carthaginians (after the fall of Syracuse). In the first Punic war, it became subject to Rome, thus acquiring the name Segesta. The ruins of the ancient city are extensive; the most remarkable are the Greek theatre and temple.

SEGMENTATION OF THE EGG. See Embryology.

SEGÓVIA, sē-gō'vĭ-ą (Sp. sā-gō'vē-ä), Spain, (1) capital of the province of the same name, on the Eresma, 43 miles northwest of Madrid, occupies a rugged height (3,300 feet), surrounded by ancient walls and defended by a turreted castle, the Alcazar. Its old-fashioned buildings are quaint but stately; its cathedral, a fine specimen of the Gothic, is scarcely surpassed in Spain. There are besides several other churches, suppressed convents, bishop's palace, mint, military academy, church seminary, theatre, hospitals and a picture gallery. The lofty aqueduct (built by Trajan) is the finest Roman ruin in Spain. Segovian Romanesque architecture is one of the most remarkable provinces of Spanish art. In few parts of the world can so much fine architecture and decorative sculpture be found. Paper, linen and glass are manufactured. The kings of Castile and Leon made Segovia their place of residence. In 1808 the town was entered and sacked by the French troops.

(2) The province covers an area of 2,713 square miles, whose surface is diversified by mountains and plains. The Sierra de Guadarrama, containing the famous defile of Somosierra, is the principal mountain. Silver, copper, lead, iron, marble and jasper are found in the mountain districts. The chief agricultural products are wheat, barley, madder, flax, hemp; besides grapes, olives, carobs and chestnuts. Large numbers of sheep are raised. Pop. 187,000.

SEGREGATION, in geology that tendency of mineral ingredients to separate from the parent magma, and to crystallize out, each by itself. In granite and other crystalline massive rocks, veinlike portions are found in which the matter is either coarser or finer than the rest of the mass. These were produced at the final stage of cooling of the rock, when the segregation from the original molten or viscous mass occurred along certain lines or around particular centres. These are termed segregation veins. Cracks or cavities may also be filled with mineral matter segregated from the surrounding rock mass. See Mining.

SEGU, sā'goo, or **SEGO,** sā'gō, West Africa, an important town of the French Sudan, in Bambara, on the left bank of the Niger, about 30 miles above Sansandig, and 350 from Timbuktu. The houses are built of clay, of a square form, with flat roofs; some of them have two stories and many of them are whitewashed. Besides these buildings, Moorish mosques are seen in every quarter. This town has been for many centuries a stronghold for the Mohammedan faith. Pop. over 30,000.

SEGUIDILLA, sĕg-ĭ-dĕl'yă, a Spanish form of versification, consisting of four lines, generally assonant lines, of seven and five syllables alternately. It usually has a close of three verses, called *estribillo,* of which the first and last lines rhyme.

SEGUIN, Edouard Onesimus, American physician: b. Clamecy, France, 20 Jan. 1812; d. New York, 28 Oct. 1880. He was educated at the college of Auxerre and Saint Louis and studied medicine under Jean Gaspard Itard. The latter urged him to undertake the treatment of idiocy, and after careful study of the causes and conditions of congenital delinquencies, he opened a first school for the training of idiots in 1839. In 1844 a committe of the Academy of Sciences examined and commended his methods. After the revolution of 1848 he settled in the United States. In 1873 he was American commissioner to the Vienna exposition and published a 'Report on Education.' During his later years he gave attention to the study of animal heat and invented a physiological thermometer. He was connected with various medical societies and president of the Association of Medical Officers of American Institutions for Idiotic and Feeble-minded Persons. His published contributions to the subject include, 'Théorie et pratique de l'éducation des idiots' (1841–42); 'Traitement moral, hygiène et éducation des idiots et des autre enfants arrières' (1846); 'Historical Notice of the Origin and Progress of the Treatment of Idiocy,' translated by J. S. Newberry (1856); 'Idiocy and its Treatment by the Physiological Method' (1866). Besides these he wrote a number of works on medical thermometry.

SEGUIN, Edward Constant, American physician and neurologist: b. Paris, France, 1843; d. New York, 19 Feb. 1898. He was the son of Dr. Edouard Onesimus Seguin (q.v.), and came with his father to America after the revolution of 1848. He was educated in the public schools of Ohio, began studying medicine with his father in 1861 and continued it at the College of Physicians and Surgeons in New York. He spent two years in the medical department of the Union army while enrolled as a student, and contracted a tubercular difficulty, to cure which he served among the United States volunteers at Little Rock, Ark., during part of 1864–65, and again in New Mexico during 1868–69. During the winter of 1869–70 he studied nervous diseases under such Parisian specialists as Brown-Séquard, Charcot, Ranvier and Cornil, and on his return to New York entered into a medical partnership with Dr. W. H. Draper. He was appointed pathologist to the Connecticut Hospital for the Insane at its opening and held the post 10 years. From 1871 to 1885 he was a member of the faculty of the College of Physicians and Surgeons, giving lectures on the spinal cord and on nervous diseases. In 1873 he founded a clinic for nervous diseases. Apart from these duties he carried on an independent practice in his specialty, beginning with 1876. He was one of the founders of the American Neurological Association, and the New York Neurological Association. He bequeathed to the Academy of

Medicine his large collection of books and pamphlets relating to nervous diseases, and to the College of Physicians and Surgeons other books and instruments.

SÉGUR, sā-gür, **Joseph Alexandre,** French writer: b. Paris, France, 1756; d. there, 1805. He was author of operas and comedies which are still read, and also wrote 'Correspondance secrète entre Ninon de l'Enclos, le Marquis de Villarceaux et Madame de Maintenon'; 'La femme jalouse,' etc. A selection of his works has been published, 'Œuvres diverses' (1819).

SÉGUR, Paul Philippe, COMTE DE, French historian, son of the preceding: b. Paris, 4 Nov. 1780; d. there, 25 Feb. 1873. He entered the army in 1796 and rose to be brigadier-general and aide-de-camp to Napoleon during the Russian campaign. He was made a peer by Louis Philippe, and after the second Restoration retired to private life. He wrote 'Histoire de Napoléon et de la grande armée pendant l'année 1812' (1824); 'Histoire de Russie' (1829); 'Histoire de Charles VIII' (1835).

SÉGUR-D'AGUESSEAU, dä-gē-sō, **Louis Philippe,** COMTE DE, French dramatist and historian, brother of the preceding: b. Paris, France, 10 Dec. 1753; d. there, 27 Aug. 1830. He was forced by his father to enter military life, served under Rochambeau in America, was appointed ambassador to Russia in 1783, and after the overthrow of the monarchy devoted himself to literature. He was appointed a member of the council of state by Napoleon and after the Restoration was received into the Chamber of Peers. He published 'La politique de tous des cabinets de l'Europe' (1793); 'Théâtre de l'Hermitage' (1798); 'Tableau historique et politique de l'Europe de 1786–96' (1800); 'Histoire des principaux événements du règne de Frédéric-Giullaume II' (1800); 'Histoire universelle' (1817); 'Histoire de France' (2 vols., 1824–34); 'Mémoires ou Souvenirs et Anecdotes' (1825); 'Œuvres complètes' (34 vols., 1824 et seq.).

SEGURA RIVER, sā-goo'rä, Spain, a river rising in the province of Jaen, and flowing eastward in a winding course, past the city of Murcia, into the Mediterranean Sea. It enters the latter about 45 miles north of Cartagena after a course of 150 miles. In its upper course it flows through arid heath-lands, but lower down it has been made to irrigate its valley by means of numerous canals, the result being the proverbially fertile *Huerta de Murcia.* As a consequence of drawing off the water, however, the main channel is practically unnavigable.

SEIDEL, sī'dĕl, **Emil,** American socialist politician: b. Ashland, Pa., 13 Dec. 1864. He learned the wood carver's trade in Germany. He was one of the organizers of the Wood Carvers' Union, and of the Socialist party at Milwaukee, Wis. He was Socialist candidate for governor of Wisconsin in 1902; and was elected mayor of Milwaukee in 1910, serving one term.

SEIDL, zī'd'l, **Anton,** Hungarian composer and musical director: b. Budapest, Hungary, 6 May 1850; d. New York, 28 March 1898. He studied at the Leipzig Conservatory, and later at Budapest under Hans Richter, and by that musician was recommended to Richard Wagner when the latter was preparing for the opening of the Baireuth Festspielhaus. As a consequence he came into intimate association with Wagner and acted as stage manager during the first season of music dramas there in 1876. In 1878 Seidl became musical stage manager at the Royal Opera House, Vienna, and the next year migrated to Leipzig where he was made conductor. After conducting the Nibelung dramas at London in 1882 he joined a company traveling through Germany, Austria, Hungary, Italy, Belgium and Holland during the seasons of 1883–84, which produced only the Wagner operas. He was made conductor at the Metropolitan Opera House, New York, in 1885 after the death of Dr. Leopold Damrosch, and thenceforth, though he made temporary sojourns in Europe filling musical engagements, he regarded America as his home. His influence upon the development of musical taste in this country was extended. Besides being made conductor of the concerts of the Philharmonic Society he was the organizer of the popular concerts held during several successive summers at Brighton Beach. Consult Krehbiel, H. E., 'Anton Seidl' (New York 1898.

SEIDLITZ (sĕd'lĭts) **POWDER,** an aperient powder named from the mineral spring of Seidlitz or Sedlitz in Bohemia. Seidlitz powders are prepared in two parts, each contained in a separate envelope. The alkaline portion, which is contained in a blue paper, consists of two drams of Rochelle salts (tartrate of soda and potash) and 40 grains of bicarbonate of soda; and the acid part, in a white paper, of 35 grains of tartaric acid. In preparing for use, the alkaline portion is dissolved in half a tumbler of water, and the acid part is then added, producing effervescence; and the draught is to be taken while the effervescence is going on. Sometimes a little sulphate of magnesia is added to increase the strength.

SEIGNIORAGE, sē'nyôr-āj. See COINAGE; FINANCE.

SEIGNORY, or SEIGNIORY, (1) in English law, the lordship retained by a grantor after alienation of land in fee simple, and regarded as an incorporeal hereditament. The seignory dates back to Roman times, and later found its way to England, where the only seignories now existing are those created before 1290. By a statute passed in England in 1882, a tenant for life of a manor may alienate the seignory of any freehold land within such manor. The lordships of manors are the only seignories of consequence to-day in England.

(2) In Canada, land held by a tenure resembling that of feudal times; also, a seignor's mansion.

SEISIN, *in law,* (1) possession of land by one claiming a freehold therein; also, the land so possessed. The possession must be actual and by a person entitled to the land or by one claiming a freehold interest therein. If the person having possession is disseized by one who intends to hold the freehold, either with or without legal right, the freehold is thereby transferred to the disseizor. Actual possession is known as "seisin in deed," while a right of present possession is known as "seisin in law."

(2) The ceremony accompanying the delivery of possession of land held in freehold: in this sense often called "livery of seisin."

SEINE, sān (ancient, SEQUANA), a river in France, which rises in the department of Côte-d'Or, at the southwestern extremity of the Plateau de Langres, on the northern slope of Mont Tasselot, in the Bois de Chanceaux, about six miles northwest of Saint Seine and 20 miles northwest of Dijon. The first part of its course is north-northwest through the departments of Côte-d'Or and Aube, passing Châtillon and Troyes. After receiving the Aube at Marcilly, it proceeds almost due west, passing Nogent and entering the department of Seine-et-Marne, receives the Yonne at Montereau and shortly after the Loing and the Loing Canal, all on the left. Here its course becomes again north-northwest and it proceeds through the departments of Seine-et-Marne, passing Melun; the southeast of Seine-et-Oise, passing Corbeil; and Seine where, shortly before entering Paris, it receives the Marne on the right. Traversing Paris it shortly after commences a long series of remarkable windings, receives the Oise on the right, traverses the northwest of Seine-et-Oise, passing Mantes; the department of Eure, passing Pont de l'Arche and receiving the Eure; and that of Seine-Inférieure, where it flows through Rouen. Resuming its series of windings across the southern part of that department it forms a long and wide estuary and finally joins the English channel near Le Havre. Its direct course is 270 miles; its winding course about 500 miles. Of the latter, 350 miles, commencing at Méry below Troyes in the department of Aube, are navigable, but only by barges, which require to be tracked against the current if not moved by steam. The navigation properly commences at Rouen, from which to the port of Havre the river is usually distinguished by the name of the Seine-Maritime and at full tide floats sailing vessels of from 400 to 500 and steamers of 600 to 800 tons. Its estuary is much encumbered by shifting sandbanks and dredges are constantly employed to remedy this evil. At the time of the equinoctial gales and at spring-tides a "tidal bore" locally the *mascaret* with a perpendicular front rushes up the river with a great noise as far as Jumiéges and sometimes even to Rouen. The area of the basin of the Seine is 16,700 square miles. The river is well supplied with fish. The scenery, though in parts surpassed by the Loire, Saône and Garonne, taken as a whole, with the hills and valleys, forests and meadows, superb mansions, numerous villages, populous towns and famous cities which line its banks make the Seine the finest river in France.

SEISMOGRAPH, sīs'mō-grăf, or **SEISMOMETER,** an instrument for recording the period, extent and direction of each of the vibrations which constitute an earthquake. For a complete seismograph, three distinct sets of apparatus are required: (1) To record horizontal motion; (2) to record vertical motion; and (3) to record time. The horizontal and vertical motions must be written on the same receiver, and if possible side by side, while at the instant at which the time is recorded a mark must be made on the diagram which is being drawn by the seismograph. The first instruments were merely modifications of the SEISMOSCOPE (q.v.), but successive improvements have been introduced, and the seismograph has been brought to a high pitch of perfection. Some of the best, if not the best, forms known are in use in the Imperial Observatory at Tokio, Japan. Milne's pendulum seismograph is a common form. This has a horizontal pendulum, swinging like the boom of a schooner. At the movable end of the pendulum is a box with a light which shines through the hollow pendulum rod, coming out through slits. By an ingenious mechanism any trembling of the light coming through the slits is recorded on a band of paper passing over a slowly moving timed cylinder. The Marvin seismograph, used by the Weather Bureau at Washington, employs a pendulum pointing upward, as in a metronome. The balance mechanism is of exceeding delicacy, and the mounting of the instrument is extremely solid to protect it from local vibrations. The record is taken on a traveling paper band in the ordinary manner.

SEISMOLOGY, sīs-mŏl'ō-jĭ, that branch of physical science which is concerned with the study and investigation of the phenomena of earthquakes, their causes and effects, their distribution, and the various circumstances attending their occurrence. Its pursuit is regarded as of the utmost importance to geological and other forms of terrestrial research. Seismology, however, is not limited to the study of earthquakes in the usual restricted sense, but deals with related phenomena occurring under many and differing aspects. According to leading authorities, it should investigate minute movements or tremors of the earth which escape ordinary observation; pulsations of the earth which, by reason of the length of their period, are not noticed; and oscillations, or elevations and subsidences of the earth which slowly alter the relative land and sea levels. Seismology has been developed almost wholly since the beginning of the 19th century, and must still be regarded as in the early stages of its progress; but already it has a great and growing body of materials and of literature, and its possibilities seem to point to the application of the science in practical ways. One of these, it is confidently predicted, will be the warning of dwellers in seismic regions when earthquakes or similar disturbances impend. See EARTHQUAKE.

SEISMOSCOPE, the earliest and simplest form of earthquake recorder. The first known was invented by a Chinese named Choko, in 136 A.D., and shows the occurrence and direction of an earthquake by the fall of a column, a principle which was afterward independently adopted in the West. Vessels filled with viscid liquids have been used; the height to which the liquid is washed up the side of the vessel being taken to indicate the intensity, and a line joining the points of maximum motion to denot the direction of an earthquake. Palmieri's seismoscope consists of horizontal tubes turned up at the end, partly filled with mercury. To intensify the motion of the mercury, small floats of iron are placed on the surface, attached by threads to a pulley provided with indices moving in front of a scale of degrees, whence the intensity may be read off. The direction is determined by the azimuth of the tube giving the maximum indication, several tubes being placed in different azimuths. Pendulum seismoscopes,

both swinging and fixed, have also been employed. See SEISMOGRAPH.

SEISTAN, sās-tăn, or **HAMUN, Lake,** Afghanistan, a large, irregularly-shaped, shallow lake or swamp on the western frontier adjoining the Persian province of Khorassan; a division of this province is named Seistan after it. The lake is not a single expanse of water, but is divided into three depressions. A great part of the area is generally dry; but, as the basin has no outlet, when the Helmund and its other feeders are in flood this lake regularly overflows its boundaries, fertilizing large tracts of country. The great variations in the size of this remarkable salt water lake give it a peculiar interest. The rainfall of the region is usually not over three inches, and in the spring a few pools only mark the seistan area. But as the depression here is 1,000 feet below sea level, it attracts the drainage of some 125,000 square miles, so that at times the lakes or chain of lakes is quite extensive. A sufficiency of grain is easily grown to support the population — over 200,000. There is an abundance of water-fowl, living in the vast reed-beds of the salt marsh.

SEITZ, sīts, **Don Carlos,** American newspaper manager: b. Portage, Ohio, 24 Oct. 1862. He was graduated at Liberal Institute. Norway, Me., in 1880. He was city editor of the Brooklyn *Eagle* in 1889–91; was later connected with the New York *Recorder* and with the Brooklyn *World;* was advertising manager of the New York *World* in 1895–97, and has been its business manager since then. Author of 'Discoveries in Everyday Europe' (1907); 'Writings by and about James McNeill Whistler' (1910); 'Surface Japan' (1911); 'The Buccaneer' (1912)'; 'Whistler Stories' (1913); 'In Praise of War' (1917), etc.

SEIXAS, sēk'sąs, **Gershom Mendes,** American patriot and minister: b. New York, 14 Jan. 1745; d. there, 2 July 1816. He was a son of a refugee from Lisbon (who settled in New York about 1730), and choosing the Jewish ministry as his profession in 1766 was placed in charge of the Spanish and Portuguese Synagogue of his native city. On the outbreak of the Revolution he espoused the American cause, closing the synagogue rather than continue it under British rule. While the majority of his people went to Philadelphia he settled in Stratford, Conn., until in 1780 he was asked to organize a synagogue in Philadelphia, the "Mikve Israel," where he continued to display his patriotic zeal. Owing largely to his efforts on 23 Dec. 1783 a modification in the test clause in the Pennsylvania constitution was made, whereby Jews were subjected to no disqualification for office. After the evacuation of New York in 1784, the old synagogue was re-established and Seixas resumed his former charge. In 1787 he was appointed one of the trustees of Columbia College, holding the office uninterruptedly until 1815. When Washington was inaugurated in 1789 Seixas was selected as one of the ministers to take part in the ceremonies.

SEJANUS, sē-jā'nŭs, **Lucius Ælius,** son of a Roman knight, and favorite of Tiberius: b. Vulsinii in Etruria; d. Rome, 31 A.D. In 14 A.D. he was made commander of the Prætorian bands, and acquired the confidence of the suspicious Tiberius, to such an extent as to govern him completely; while the servile senate paid complete deference to the powerful favorite, the prætorian cohorts were also favorable to him, and there was no obstacle in the way of his attaining the supreme power he aimed at but Drusus, son of Tiberius, and the sons of Germanicus, Drusus and Nero, the nearest of kin to the emperor. Drusus was put out of the way by poison; the latter, with their mother, were banished and thrown into prison, a step which they did not long survive. Several friends of Germanicus were beheaded at the instigation of Sejanus; and when Tiberius finally retired from Rome, and withdrew from the government, Sejanus governed with absolute power, and the senate ordered that the statues erected in his honor should be publicly worshipped. But at the moment of his highest elevation the suspicions of Tiberius were awakened, and his measures were taken so cautiously, that Sejanus suspected nothing until openly accused by the emperor before the senate. He was then imprisoned, condemned to death, and executed on the same day. The historian Tacitus has given a searching and vivid, although possibly a prejudiced, account of the character and intrigues of Sejanus, while his fate is the subject of a tragedy of Ben Jonson's. Consult Tacitus, 'Annals' (iv, 1, 2, 3, 8, 39ff.; 74, and v, 6ff); Suetonius, 'Tiberius'; Jülg, 'Vita Lucii Ælii Sejani' (Innsbruck 1882); and Tarver, J. C., 'Tiberius the Tyrant' (New York 1902).

SEKAKUL, an African parsnip (q.v.).

SEKI KOWA, sā'kē kō'wa, or **SEKI SHINSUKE KŌWA,** or **TAKAKAZU,** Japanese mathematician: b. Fujioka, near the present Tokio, province of Kōzuke, 1642; d. near there, 1708. He was of the samurai class and became the greatest mathematician of his time in Japan, benefiting, however, by the work of several great Japanese mathematicians immediately preceding him, among whom was Yoshida. He was famous both as a teacher and for his discoveries, and his work greatly improved the algebra of the Japanese, which had come to them from the Chinese. He understood the native calculus, *yenri,* which he may have invented; and also knew the principle of determinants. Most of his manuscripts are lost. Consult Mikami, Y., 'Development of Mathematics in China and Japan' (1913); and Smith, D. E., and Makimo, Y., 'A History of Japanese Mathematics' (1914).

SELACHII, sē-lā'kĭ-ī, the order of fishes now known more generally as the *Elasmobranchii,* which includes the sharks, rays and their allies. See ICHTHYOLOGY; SHARKS, ETC.

SELAGINELLA, sę-lăj-ĭ-nĕl'a, club moss, a genus of mostly tropical plants with small scale-like leaves and propagated by spores. (See FERNS AND FERN-ALLIES). The species are very numerous, and widely distributed in warm regions. They are generally quadrangular, the two lower rows of small one-veined leaves larger than the upper two rows, thus giving a flattened look to the fronds. They are generally creeping plants, often forming moss-like mats of foliage, but in some species supported by other plants, are erect and often several yards long. Selaginellas are cultivated in green houses both as pot plants, for edgings, and for hiding bare earth with their verdant foliage, sometimes iridescent, or changing in hue. *S. lepidophylla,* a Mexican species, growing in flat rosettes, while not very beautiful, is one of the familiar resurrection plants, because it becomes desiccated in time of drought and revives when moist conditions return. When dried out, it rolls its branches inward forming a ball, in which condition it is blown to a new situation by the wind. If it be placed in water the brown stems uncurl, flatten out into fern-like fronds and become green, and if this be done within a reasonable time after its uprootal, the selaginella will start into a new, genuine growth.

SELAH, sē'la, a Hebrew word which occurs 71 times in the book of Psalms and three times in the prayer of the prophet Habakkuk (Hab. iii), and is retained in the English Authorized version of the sacred texts; in the Septuagint version it is represented by the word *diapsalma.* Its signification cannot be definitely ascertained, but commentators interpret it variously as indicating either a pause or repetition, or the end of a strophe, or playing with full power, or a short recurring symphony, or, finally, a bending of the body in reverence. Dr. C. A. Briggs explains the term as a derivation from a verb meaning "to lift up" as in "raising" a hallelujah. Consult Jacob in '*Zeitschrift für alttestamentliche Wissenschaft* (Vol. XVI, Giessen 1896); Briggs, C. A., in *Journal of Biblical Literature* (Vol. XVIII, Boston 1899); Briggs, E. C., in *American Journal of Semitic Languages* (Vol. XVI, Chicago 1899); Briggs, C. A. and E. C., 'Commentary on the Psalms' (New York 1906–07).

SELBORNE, sĕl'bŏrn, **Roundell Palmer,** 1ST EARL OF, English statesman: b. Mixbury Oxfordshire, 27 Nov. 1812; d. Petersfield, Hampshire, 4 May 1895. He was graduated from Christ Church, Oxford, in 1834 and was called to the bar in 1837. He was returned to Parliament for Plymouth in 1847, became Solicitor-General in 1861, and was Attorney-General in 1863–66. He was knighted in 1861 and subsequently was made Baron Selborne. He was appointed Lord Chancellor in 1872 and did much to aid the establishment of a Supreme Court of judicature in 1873, but on the fall of the ministry in 1874 he again went out of office. He was reinstated as Lord Chancellor in 1880, was created Earl of Selborne in 1882, and in 1886 he separated from Gladstone on the Home Rule question and thereafter his political work was concerned chiefly with legal reform. He published 'The Book of Praise' (1863); 'Notes of Some Passages in the Liturgical History of the Church of England' (1878); 'Ancient Facts and Fictions Concerning Churches and Tithes.' Consult 'Selborne Memorials' (London 1896–98).

SELDEN, John, English scholar and statesman: b. Salvington, Sussex, 15 Dec. 1584; d. London, 30 Nov. 1654. He was educated at Oxford and afterward called to the bar of the Inner Temple. His first work, 'Analecton Anglo-Britannicon,' was a history of civil government in Britain before the Norman conquest. This notable publication was followed by two others dealing with the later progress of English law, and with the history of English titles of honor. His 'History of Tithes' (1618) so offended James I that its author was severely censured by the High Commission court, and later cast into prison by the king for denying that Parliament owed its privileges to the Crown. As a member of the first two Parliaments of Charles I, in the second of which he supported the impeachment of the Duke of Buckingham, and in the famous Long Parliament in 1640, his career was marked by great zeal for the advance of civil and religious liberty. In 1629 he published the work upon the Arundel Marbles ('Marmora Arundellia'), for the translation of whose inscription he is famed. His other publications include 'De Successionibus in Bona Defuncti Secundum Leges Hebræorum' (1634); 'De Successione in Pontificatum Hebræorum Libri Duo' (Leyden 1638); 'De Jure Naturali et Gentium juxta Disciplinam Hebræorum' (1640). His 'Marie Clausum' (1635) was written in reply to Grotius' 'Mare Liberum.' His most famous work, however, is his 'Table-Talk' (published by his amanuensis, Richard Milward, in 1689 and reprinted in London 1868). Consult Wilkins' collection of Selden's works, with life of the author (1726) and Aikin, 'Life of Selden'; Johnson, G. W., 'Memoirs of John Selden' (10 vols., New York 1883–84); and Waters, Robert, 'John Selden and His Table-Talk' (ib. 1899).

SELECTIVE SERVICE LAW AND DRAFT. The Act of Congress authorizing the President to increase temporarily the Military Establishment of the United States, approved 18 May 1917, provided for the raising and maintaining by selective draft of increments (in addition to the regular army and national guard of 500,000 men each, together with recruit training units for the maintenance of such increments at maximum strength, and the raising, organizing and maintaining of additional auxiliary forces and also for raising and maintaining at their maximum strength, by selective draft when necessary, the regular army and the national guard drafted into the service of the United States. It also provided that such draft shall be based upon liability to military service of "all male citizens, or male persons not alien enemies, who have declared their intention to become citizens, between the ages of 21 and 30 years, both inclusive"; that the several States, Territories and the District of Columbia should furnish their proportionate shares or quotas of the citizen soldiery determined in proportion to the population thereof, with certain credits allowed for volunteer enlistments in branches of the service then organized and existing. The nation was confronted with the task of constructing, without delay, an organization by which the selection might be made for the entire country by means of a uniform and regulated system. A suggestion of administration, incomplete because of entirely different conditions, arose from the precedent of the Civil War draft; and on 22 May 1917 the judge-advocate-general was detailed as "provost-marshal-general" and charged with the execution, under the Secretary of War, of so much of the act of 18 May "as relates to the registration and selective draft." Plans had already been formulated for the operation of the selective draft, and with the formal designation of the provost-marshal-gen-

eral the work of organization began. It was obvious that to build up a new Federal organization would require a greater period of time than was afforded by the military necessity. The existing governmental organizations of the several States were presented as available substitute and the statute authorized their use. This expedient was unprecedented, but its practice abundantly justified its adoption.

The immediate need was for a comprehensive registration of every male of draft age. To effect this registration each State was divided into districts containing a population of approximately 30,000, in each of which a registration board was appointed by the governor. Usually this board consisted of the sheriff, the county health officer and the county clerk; and where the country's population, exclusive of cities of more than 30,000 inhabitants, exceeded that number, additional registration boards were appointed. Cities of over 30,000 were treated as separate units. The election district was established as the actual unit for registration in order that the normal election machinery might be utilized, and a registrar for every 800 of population in each voting or election precinct was appointed by the registration board. In cities approximating 30,000 of population the registration board was made up of city officials, and where the population exceeded the unit number additional registration boards of three members were appointed, one a licensed physician.

Governors and mayors were given considerable latitude in making geographical divisions of the States and cities for the purpose of defining registration jurisdictions; the only limitation being that approximately 30,000 inhabitants should be included within the confines of a district. The general scheme was that the board of three should exercise supervision over the precinct registrars, the governors supervising the work of the registration boards, while the mayors of cities containing 30,000 or more inhabitants acted as intermediaries between governors and registration boards. Each State was constituted a separate unit and each governor was charged with the execution of the law in his State. By proclamation of the President, 5 June 1917, was designated as registration day throughout the United States, with the exception of Alaska, Hawaii and Porto Rico; and, due to the fact that registration organization of the States had been so quickly and thoroughly completed, 9,586,508 male citizens of the designated ages were registered on the day set, and the first step in the operation of the selective service law was accomplished. Registration consisted in entering on a card essential facts necessary to a complete identification of the registrant and a preliminary survey of his domestic and economic circumstances.

With the registration completed there followed the operation of examination, selection and mobilization. The unit jurisdiction of approximately 30,000 of population was maintained as far as possible, and for each district or division a local board of three members was appointed by the President upon the recommendation of the governor. The board members were residents of the districts they served, and the personnel comprised representative and responsible citizens of the community, including usually a licensed physician. In many cases registration boards were reappointed local boards. Such boards exercised original jurisdiction in all cases except claims for discharge on account of engagement in industry or agriculture. In every Federal judicial district one or more district boards were organized, consisting usually of five but in some cases of a larger number of members, comprising leading citizens of the community and appointed by the President upon the recommendation of the governor. District boards exercised appellate jurisdiction over local boards and original jurisdiction in industrial and agricultural claims. The initial step in the process of examination and selection was to establish the order of liability of each of the registrants to be called for service. The cards within the jurisdiction of each local board, taken as a unit, had been serially numbered when completed and filed, and duplicates of the cards so numbered were deposited with the governor and with the district boards. The average number of registrants within the jurisdiction of a local board was about 2,500, the highest being 10,319. In order to establish the order of liability of each registrant in relation to the other registrants within the jurisdiction of the same local board, a drawing was held 20 July 1917 in the public hearing room of the Senate Office building in Washington, as a result of which every registrant was given an order number and his liability to be called for examination and selection determined by the order number. The official lists of the numbers drawn by lot were furnished to every local board and from these lists the boards made up the availability order list of all registrants within their respective jurisdictions.

The selective service law required certain persons to be exempted from military service, including Federal and State legislative, executive and judicial officers, ministers of religion, students of divinity, persons in the military or naval service of the United States and certain aliens. The law further authorized the discharge from draft, under such regulations as the President might prescribe, of county and municipal officers, custom-house clerks and other persons employed by the United States in certain classes of work, pilots and mariners, and, within prescribed limitations, registrants in a status with respect to persons dependent upon them for support and persons found physically or morally unfit. Exemption from combatant service only was authorized in the case of persons found to be members of any well-recognized religious sect or organization whose existing creed or principles forbid its members to participate in war in any form, and whose religious convictions are against war or participation therein. The success of this great undertaking was primarily due to the painstaking forethought and the statesmanlike breadth of view with which the provost-marshal-general and his associates organized the machinery for its execution. But other elements have contributed to its success, and first among these was the determination to rely upon the co-operation of the governors of States and State agencies in the assembling of the registration and exemption boards. By reason of this association of State and local agencies with the National government the law came as no mandate enforced by soldiers, but as a working of the home institutions in the hands of neighbors and acquaintances pursuing a clear process of selection, and resulting in a gift by the States to the nation of a body of men to be trained. The press of the country co-operated in a most helpful way, drawing the obvious distinctions between this mode of selection and those punitive drafts which have sometimes been resorted to after the failure of volunteering, and pointing out to the young men of the country that the changed conditions of warfare made necessary a mode of selection which would preserve the industrial life of the nation as a foundation for successful military operations. The country seemed generally to have caught enough of the lessons of the European War to have realized the necessity of this procedure, and from the very beginning criticism was silenced and doubt answered by the obvious wisdom of the law. The unquestioned fairness of the arrangements, the absence of all power of substitution, the fact that the processes of the law were worked out publicly, all co-operated to surround the draft with assurances of fairness and equality, so that throughout the whole country the attitude of the people toward the law was one of approval and confidence. This does not mean that the law is perfect either in its language or in its execution, but that its passage may be regarded as a milestone in progress toward self-consciousness and national strength. Its acceptance shows the unity of spirit of the people, and its operation shows that a democracy has in its institutions the concentrated energy necessary to great national activities, however much they may be scattered and dispersed, in the interest of the preservation of individual liberty, in time of peace. The problem presented involved not merely the selection of forces to be trained into armies but officers to do the training. By the provisions of the national defense act of 3 June 1916 officers' reserve corps had been authorized. Rules and regulations for their organization were promulgated in July 1916, and amended in March 1917. Immediately upon the passage of the act the building up of lists of reserve officers in the various sections of the military establishment was undertaken, with the result that at the end of the fiscal year some of the branches of the service had substantial lists of men available for duty in event of call. The largest number of commissions were issued in the technical services, for which professional non-military training was the principal requisite. The largest reserve corps was that in the medical department, in which more than 12,000 physicians were commissioned. The expansion of these technical services proceeded easily upon the basis of the reserve corps beginning, but the number of applicants for commissions in the strictly military or combatant branches of the service was relatively small. They consisted of men who had had military experience either in the regular army or the national guard, and men who were graduates of schools and colleges affording military training, and of the training camps which had been maintained at Plattsburgh and throughout the country. Their number, however, was wholly inadequate, and their experience, while it had afforded the elements of military discipline, had not been such as was plainly required to train men for participation in the European War with its changed methods and conditions.

The original selective service law, with its subsequent amendments, mobilized the man power of the nation between the ages of 18 and 45, inclusive. Under the original and later acts approximately 23,709,000 men were registered and slightly over 2,800,000 were inducted into the military service in a manner that was fair to the individual, efficacious in providing the army with men as quickly as they could be equipped and utilized and provocative of a minimum of disturbance to the industrial and economic life of the nation. After 15 Dec. 1917 the administration of the law was greatly improved by the system of classification that was employed in the selection of men. The economic needs of the nation required that men whose removal would interfere with its civic, family, industrial and agricultural life should be taken in the order in which they could be best spared. On 15 December all exemptions that had previously been granted were annulled and all registrants were required to file questionnaires giving detailed information in regard to industrial status and claims for exemption. Registrants were arranged in five classes in the inverse order of their importance to the economic interests of the nation and the support of dependents. The men thus placed in class one were first rendered liable for military service, those in the other four so-called deferred classes being granted temporary exemption. On 16 May 1918, according to a joint resolution of Congress, it became possible to frame new regulations whereby the quotas to be furnished by the several States were apportioned according to the number of registrants in class one, instead of according to population, as was required by the original act of the previous year. Further registrations of men who had attained the age of 21 years since the first registration were held on 5 June 1918 and 24 Aug. 1918, according to the provisions of presidential proclamations, authorized in the joint resolution of Congress, approved 20 May 1918. On 7 Aug. 1918 the distinguishing appellations «Regular Army,» «Reserve Corps,» «National Guard» and «National Army» were ordered discontinued; and the military forces of the nation were consolidated into the «United States Army.» About the latter part of July it became evident that the carrying out of the military program would soon lead to the exhaustion of class one. In order to prevent the industrial disturbance and economic hardships incidental to calls upon the deferred classes, Congress passed an amendment to the selective service law, approved 31 Aug. 1918, which provided for the registration of all male persons between the ages of 18 and 45, both inclusive, and made registrants liable to service in the navy and marine corps as well as in the army. This registration was held on 12 September 1918. In putting into execution the provisions of the selective service law, registration was by States. Each State was divided into districts with registration boards appointed by the governor. Registration was handled by the same machinery that handles voting during elections. The subsequent work of examining and classifying registrants was handled by local and district boards appointed by the President upon the recommendation of the governors of the various States. In November 1917 two ad-

ditional types of local boards were established to aid in the administration of the draft. Medical advisory boards were appointed by the President on the recommendation of the governors. These boards varied in membership from 3 to 40 and consisted of leading medical authorities who were in a position to act in an advisory capacity to those who were charged with making physical examinations of registered men. At the same time legal advisory boards were also established to assist registrants and draft officials in the interpretation of the selective service law. These boards consisted of three permanent members appointed by the President on the recommendation of the governor and an indefinite number of associate members appointed by the governor direct. On 4 July 1918 the provost-marshal-general in a letter to the local draft officials suggested the advisability of establishing boards of instruction, which should get into close and immediate touch with newly drafted men and give them preliminary directions in order better to fit them for the duties facing them. Slightly over 2,800,000 of the registrants were inducted into military service, 2,541,000 through calls issued to local boards to furnish their allotted quotas and 259,000 through induction of individuals. Approximately 140,000 of the latter were inducted in October and during the first 10 days in November for the Students' Army Training Corps. The inductions during each month are shown in the following table:

Month	Men Inducted	Month	Men Inducted
1917		April	174,377
September	296,678	May	373,063
October	163,644	June	301,941
November	35,721	July	401,147
December	20,320	August	282,898
1918		September	252,295
January	23,288	October	250,000
February	83,779	November	10,000
March	132,484	Total	2,801,635

With the exception of the Students' Army Training Corps and a few thousands of voluntary inductions, no men of the last registration were inducted into the army. This means that of the 10,481,000 registrants between the ages of 21 and 30 approximately 2,630,000, or 25 per cent, were taken into military service through the draft. At the time of the signing of the armistice class one of the 21 to 30 years old group was practically drained of men capable of rendering full military service. Those remaining classified therein were men qualified for limited service only, men granted temporary deferment on account of employment with the Emergency Fleet Corporation and men classed as delinquents on account of failure to file questionnaires. These groups constituted about 6 per cent of the total registrants. About 4 per cent of the registrants were placed in deferred classes on the ground of employment in a necessary industrial or agricultural enterprise and about 65 per cent on all other grounds.

The balance sheet of the first draft as prepared by the provost-marshal-general's office, as of 30 Aug. 1918, shows the registration of 5 June 1917, 9,586,508; inducted or otherwise accounted for prior to 1 Dec. 1917, 897,061; number due to file questionnaires, 8,689,447; number placed in Class I, 2,473,680; number placed in Class II, 497,261; number placed in Class III, 416,456; number placed in Class IV, 3,406,240; number placed in Class V, 1,895,810; total, 8,689,447. Analysis of Class I—Total number in Class I, as of 1 Sept. 1918, 2,473,680; delinquents, 285,895; emergency fleet, 46,552; limited service, 245,234; remedial defectives, 58,950; not physically examined, 42,801; total, 679,432. Fighting men left, 1,794,248; registration of 5 June 1918, 744,865; number placed in Class I, 408,517; total, 2,202,765. Delinquents, 11,107; emergency fleet, 5,530; limited service, 32,589; remedial defectives, 9,433; not physically examined, 37,771; total, 96,430.

The nationality of aliens registered was: Co-belligerents — Belgium, 3,952; France, 3,510. Great Britain — England, 27,553; Ireland, 20,840; Scotland, 7,491; Wales, 1,563; Canada, 47,258; elsewhere, 16,479. Greece, 68,005; Italy, 245,679; Portugal, 21,943; Rumania 7,695; Russia, 275,413; Serbia, 2,852; China, 7,170; Japan, 15,336. Neutral — Denmark, 8,063; Netherlands, 6,679; Norway, 16,678; Sweden, 24,663; Switzerland, 4,929; Mexico, 59,145; Central and South America, 5,429; sundries, 22,688. Enemy — Germany, 40,663; Austria-Hungary, 238,768. Allied with enemy — Bulgaria, 7,271; Turkey, 36,031; total, 1,243,801.

As an average per capita cost for registering men for the Federal draft and inducting them into the national army by 30 June 1918 that of $1.42 in the State of New York, as shown by the Selective Service Bureau of the adjutant-general's office, may be cited. In New Rochelle the cost to the government was nothing, that city bearing the expense. In other places the induction cost per capita ran from 12 cents a man by Board 164 of New York City to $2.58 a man by Board 161 of New York City. The boards ranking next to New Rochelle and Board 164, New York City, in lowest cost were: Board 184, New York City, 26 cents per man of 2,833 men; Oneida County Board 2, 27 cents a man for 1,698 men; Orange County Board 2, 31 cents a man for 2,428 men. The highest per capita cost in cities outside of New York was in Albany City Board 1, where 2,036 men were inducted at $2 each. The highest per capita cost in counties was in Rensselaer County Board 1, where the average was $2.44 for 1,822 men going into the service for the period ending 30 June 1918.

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SELECTMEN, a name given in the New England States to the chief officer of a town or village. English parishes had their vestries, which were of two sorts, common vestries, composed of all the rate-payers and select vestries. In the latter, concerns were managed by select vestrymen. Hence the term selectmen, as used in New England, for the governing board of a town. The practice is found in Massachusetts as early as the issue of the 'Body of Liberties.' The selectmen acted under the orders of the town meeting. See TOWN AND TOWN MEETINGS.

SELENE, sĕ-lē'nē. See LUNA.

SELENGA (sā-lĕng'gā) **RIVER,** Asia, a river rising in the Khangai Mountains in western Mongolia, flowing northeast through Mongolia and the Russian Transbaikal district, and emptying into Lake Baikal near its southern end. It is 750 miles long, and navigable for light vessels to its junction with the Orkhon. It receives through the Egin-kol the overflow of the large Lake Kosso-gol. The Selenga is the main headstream of the Angora, the principal tributary of the Yenisei.

SELENITE, the crystallized or distinctly foliated variety of the mineral gypsum, hydrous calcium sulphate. It is number two in the scale of hardness, is flexible, but when broken has a "fibrous fracture" which consists of two imperfect cleavages. When pure it is colorless and transparent. The cleavage plates have a pearly lustre which is characteristic of the clinopinacoid while the other faces of the crystal are subvitreous. Plates of selenite several feet across and perfectly transparent are not uncommon, while crystals five feet in length have been found in Utah. Fine large crystals are also found in Italy, France and Switzerland. Limpid crystals of matchless beauty occur in the Sicilian sulphur mines. Twin crystals are common in all these localities, the most typical of which are the "fish-tail" twins. Foliated selenite is abundant in Nova Scotia, also at Lockport and elsewhere in New York. while crystals of model-like perfection are found near Ellsworth, Ohio. Like massive gypsum, selenite is an exceedingly common mineral. It has been used to some extent as a filler for paper, paints, etc.

SELENIUM, symbol Se, atomic weight 79.2. It was discovered by Berzelius (1817) in the refuse of a sulphuric acid factory. A non-metallic element occupying an intermediate place between sulphur and tellurium. Occurs in the free state in small amounts usually associated with native sulphur. Found in many minerals combined with various metallic elements as copper, lead, mercury, silver, etc. Here again the compounds of selenium are found in company with the analogous compounds of sulphur. Free selenium is prepared from the compounds of selenium found in the dust depsited in the furnace flues where sulphides are burned in the manufacture of sulphuric acid. This is oxidized to selenius acid (see below) which upon treatment with sulphurous acid gives selenium.

It is found that there occurs a remarkable variation in the electrical resistance of selenium as the intensity of the light which falls upon it is varied; when the light to which selenium is exposed is increased in intensity, the electrical resistance is diminished. It is this principle that is the basis of the "Selenium Photometer" of astronomy, an instrument of extreme delicacy by which the variations in intensity of the feeble light of the stars can be measured with an accuracy which is unapproachable by any other means.

Selenium exists in two allotropic forms. The one obtained as above is a red amorphous powder soluble in carbon di-sulphide, while if this powder be melted and again cooled suddenly to 210° C. it forms a dark vitreous mass insoluble in carbon di-sulphide. Crystalline forms are also known.

In general chemical behavior it is closely related to sulphur and tellurium, all three forming analogous oxides, oxygen acids and hydrogen compounds.

Selenium Dioxide, SeO_2 a white crystalline compound formed when selenium is burned or by healing selenious acid. It dissolves readily in water forming selenious acid.

Selenious Acid, H_2SeO_3, a crystalline solid found by oxidation of selenium in presence of water, as above. It is a di-basic acid forming salts called selenites having the general formula M_2SeO_3.

Selenic Acid, H_2SeO_4, a heavy liquid resembling sulphuric acid and formed by action of powerful oxidizing agents on selenium or selenious acid. It differs from sulphuric acid in being unstable, losing its oxygen readily and thereby passing to selenious acid. Also a di-basic acid forming salts called selenates (M_2SeO_4).

With hydrogen selenium forms a very disagreeable smelling gas called seleniuretted hydrogen (H_2Se), the analogues of sulphuretted hydrogen. Selenium forms compounds with many metallic elements (see above) called selenides. These are analogous to the sulphides and usually occur along with them. They may be made by heating selenium with the metal.

SELENODONT TEETH, a type of molar teeth, characteristic of modern herbivorous animals, on which the crown of the tooth exhibits curving ridges of enamel instead of rounded tubercles. See BUNODONT.

SELENSULPHUR, an orange- to brownish mineral consisting of sulphur and selenium. It is a result of volcanic action, and occurs as an incrustation in the islands of Lipari, Vulcano, Hawaii and Japan. The name is often improperly applied to orange-yellow crystals of native sulphur from Sicily.

SELEUCIA, sĕl-ū'sĭ-a, Asia, the name of several cities founded by Seleucus Nicator. (1) The most celebrated was SELEUCIA-ON-THE-TIGRIS, made the capital of Babylonia in place of Babylon, from which it was distant about 30 miles, and which it eclipsed in wealth and splendor. The Tigris and Euphrates flowed near its walls, and rendered it one of the richest commercial cities of ancient times. The number of its inhabitants at the time of its greatest prosperity is estimated to have been about 600,000, chiefly Greeks. During the decline of the Seleucidæ monarchy it became independent, and from its great wealth became the centre of attraction to the pillaging tribes of southern Armenia and Media, by whom it was partially plundered several times. In 116 A.D. it was burned by Trajan, and a few years later its destruction was completed by Lucius Verus, the Roman emperor. From that time it was deserted and became as desolate as Babylon itself. (2) Another important city, SELEUCIA PIERIA, founded in 300 B.C., was situated in the seacoast at the foot of Mount Pieria, 12 miles west of Antioch. Its natural strength was improved by every known art of fortification, and this combined with its magnificent buildings obtained for it a distinguished position among the great cities of antiquity. It occupied a very prominent place in the wars between the Seleucidæ and the Ptolemies, but it rapidly declined under the Roman dominion, and in the 6th century of our era the city had fallen into complete decay. (3) SELEUCIA TRACHEOTIS, a city of Cilica on the Calycadmes, was also built

by Seleucus. It was once a rival of Tarsus, and on its site are many ancient ruins. The modern Selefke is located here. (4) SELEUCIA, a city in Persia, was founded by Alexander the Great and called Alexandria. It was rebuilt as Seleucia by Antiochus I of Syria. Among the other cities of the name were Seleucia in Mesopotamia on the Euphrates; on the Belus in Syria; in the Pisidia; and in Pamphylia. The city of Tralles was also called by this name at one time. Consult Bouché-Leclercq, 'Histoire des Séleucides' (2 vols., Paris 1913–14).

SELEUCIANS. See RELIGIOUS SECTS.

SELEUCIDÆ, sĕ-lū'sĭ-dē, the descendants of Seleucus, a dynasty of kings who succeeded to that portion of the empire of Alexander the Great which embraced the eastern provinces, Syria and a considerable part of Asia Minor.

SELEUCUS I, surnamed NICATOR, one of the diadochi or successors to the divided empire of Alexander, 365; d. 281 B.C. His father Antiochus was a general of Philips and he himself was one of the most distinguished officers of Alexander the Great, who invested him with the government of Babylonia and Media. On the death of Alexander in 323 Seleucus joined the conspiracy against Perdiccas, which resulted in the death of the latter, and in the second division of Alexander's dominions the satrapy of Babylon fell to his share. Like the other generals of Alexander he asserted his independence, and this step being opposed by Eumenes, he obtained the aid of Antigonus against him. Their united efforts proved successful, but Antigonus now turned upon Seleucus himself, who, rather than face him, withdrew to Egypt (316 B.C.). Two or three years later he succeeded in inducing Ptolemy, the governor of Egypt, along with Lysimachus and Cassander, to take the field against their common enemy Antigonus, now grown very powerful. Their forces proving victorious, he assumed the title of king of a vast dominion extending from the Euphrates to the Indus (306). After a final victory over Antigonus the whole of Syria and a great part of Asia Minor fell to the share of Seleucus. By subsequent victories over Lysimachus and Demetrius his possessions were extended so as to include the whole of Asia Minor. He was assassinated by Ptolemy Ceraunus. He was the protector of the arts and sciences, the benefactor of his people and the most upright of Alexander's successors. Besides several cities of the name of Seleucia, he likewise founded Antioch. He was succeeded by his son Antiochus I. (See ANTIOCHUS). SELEUCUS II, surnamed CALLINICUS, succeeded his father Antiochus II in 246. He murdered his stepmother Berenice, and Ptolemy Euergetes, her brother, invaded the territories of Seleucus to avenge her death, but eventually concluded a truce with his foe and retired. After this Seleucus with varying success engaged in contests with his brother Antiochus Hierax, Tiridatus, king of the Parthians, then with Ptolemy, who had broken the truce. In an expedition, however, against the Parthians he was defeated by Arsaces I, king of Bactria. He died in 226 B.C., having reigned 20 years, and was succeeded by his son SELEUCUS III, who only reigned three years, being followed by ANTIOCHUS III, surnamed the GREAT. SELEUCUS IV, surnamed PHILOPATOR, succeeded his father Antiochus III in 186. Syria had been greatly weakened by the war carried on by Antiochus against the Romans, and Seleucus had to pay immense sums to the victors. His reign was signalized by few events of importance, and after he had been 12 years on the throne he perished from poison (175). ANTIOCHUS IV, surnamed EPIPHANES, succeeded him, and is notorious for his cruel persecution of the Jews, whose religion he attempted to extirpate. ANTIOCHUS V, surnamed EUPATOR, was the next in line (164–162). Under his reign the government was weak and corrupt. DEMETRIUS I, surnamed SOTOR, followed, but was defeated and killed by an imposter who claimed to be the son of Antiochus Epiphanes, ALEXANDER BALAS (150–145). The succeeding rulers were DEMETRIUS II (NICATOR), who was taken prisoner by the Parthians, and in whose place ANTIOCHUS VI ruled (145–140), but who later ascended the throne himself (140–137); ANTIOCHUS VII (SIDETES) who restored the royal line and was the last strong ruler of the Seleucidæ; SELEUCUS V, who was murdered by his mother Cleopatra; ANTIOCHUS VIII (GRYPUS), who reigned in 125–96 sharing from 111 his kingdom with his step-brother Cyzicenus Antiochus IX; SELEUCUS VI (EPIPHANES), 96–95; ANTIOCHUS X (EUSEBES), 94–92; PHILIP I, 95–83; ANTIOCHUS XI (EPIPHANES), during 95; DEMETRIUS III (EUCÆRUS), 95–87; TIGRANES (84–69), who gained the sovereignty next by conquest; ANTIOCHUS XII (DIONYSUS) and ANTIOCHUS XIII, ASIATICUS (69–64) who was conquered by the Romans under Pompey who made Syria a Roman province in 64 B.C.

The power of Seleucidæ began to decline as early as the reign of Seleucus II, and they successively lost, through revolts and otherwise, Bactria, Parthia, Armenia, Judæa, and what subsequently remained was converted into a Roman province in 64 B.C. Consult Bevan, E. R., 'House of Seleucus' (2 vols., London 1902); Bouché-Leclerq, 'Histoire des Séleucides' (2 vols., Paris 1913–14); Haussoullier, Bernard, 'Etudes sur l'histoire de Milet et du Didymeion' (Paris 1902); Macdonald, G., 'Early Seleucid Portraits' (in *Journal of Hellenic Studies*, Vol. XXIII, London 1903).

SELF-CONSCIOUSNESS, the conscious recognition that one is an ego or personality; distinguished from Consciousness (q.v.). In the article in this encyclopedia on consciousness, it is treated from the material point of view. Self-consciousness here will be treated from the occult or Eastern viewpoint. Each one of us is conscious of himself as an identity or unit, different from every other individual. We know this as fundamentally as we know anything, and while we cannot prove to any of our five senses just what this identity is, this does not militate against the fact of its being a truth. The five senses inform us of material outside things, which science has catalogued and philosophy reasoned upon; but self-consciousness comes to us as an intuition, being recognized in the same way as that which we call conscience, which may be defined as a phrase of self-consciousness. It is characteristic of this self-consciousness that it instinctively knows right from wrong, and thus tends to a recognition of morality as the way of evolution. That the consciousness of all men is in a stage of evolution is easily reasoned out. The babe has a very dim consciousness, and hence little responsibility. The drunkard or dope fiend has reduced his consciousness, and we hold him to be little accountable for what he does under such conditions. The wise man is one who has opened his consciousness to a great many things, and we expect much more of such a one and hold him to a much higher responsibility. It is not too much to say that the destiny or forward movement of the race seems to rest mainly with its wise men, those who are wise in morals as well as science. We cannot set our ideals any higher than what we can conceive of; in fact man appears to be ever setting his ideals above his actions, never quite as good or as clever as he could wish; and when he improves he sets his ideals yet higher, and so never reaches them. This condition is named the development of consciousness. There comes a time in the progress of every man when he realizes that he is higher and apart from matter — and this is true even if men have not yet attained to that realization. We are not mere animals, but are imbued with a life principle and a higher force which is higher even than the human mind. The proof of this is that a few men and women have learned to control their minds, to concentrate on a fixed point until the active mind is absolutely stilled. Any person of good intelligence can do this with practice, if he have the will and the patience, for it takes a great deal of both. That which is highest in man — call it the soul, the Divine spark, the ego or what you will — is designed to govern both the mind and body. The majority of people have little government over their bodies, and a still smaller fraction have definite control over their minds. Yet all truly great men do rule both their appetites and their minds, for thus can they rise far above the crowd and accomplish the things for which we call them great. But the self-conscious individual is one who has come to recognize this divinity of the higher nature, this attribute of the God within, and who is striving to evolute to still higher paths of usefulness, that he may serve humanity. For it is a characteristic of those who have attained the greatest degree of self-consciousness that they discover nothing higher in the way of accomplishment than the service of mankind; and if they give time and effort to developing themselves it is that they may be the more fit to serve their fellows. The intellectual materialist who has not proceeded far on the way toward self-consciousness will probably challenge some of these statements because he has not experienced them, and what he has not felt he refuses to accept, as if it were possible for any one man to have all experiences or all knowledge. These sort of truths are taught by all grades of philosophers from ancient to modern times. But without depending upon authority, each of us can ask himself the question, "What is this within me that I call *I*? — that sits in judgment on my acts? — that impels me toward higher things, and condemns me when I yield to lower desires?" This it is that is here characterized as self-consciousness. The more I consult it, the more I listen to its voice, the more plainly it speaks, and it always teaches unselfishness and morality. When it is listened to, it informs a man of his faults, and thus assists him in curing them. To those who study their own consciousness it reveals other things — that they have faculties and powers, and that these appear supreme in their own domain. In other words, a man has will, which is his own, and choice, of which no one can deprive him. Will and choice send one man in search of the North Pole, another to the forefront of a battle, another to the bedside of the dying, another to the accumulation of wealth, another to a study of the stars, another to investigation of the laws of electricity, and so on *ad infinitum*. It is these qualities of finite godship which lead many to the conclusion that man is a spark of the Divine, and bound to evolute forever; that while he has freedom of will and choice for good or evil, he is never free from the hyperphysical superior will of good (or God) which always overcomes evil. Consult Steiner, 'The way of Initiation' (English trans., New York, 1910); Besant, 'A Study in Consciousness' (1900); Hudson, 'Evolution of the Soul'; Judge, 'Culture of Concentration' (1885).

CHARLES H. COCHRANE.

SELF-DEFENSE is the right to protect one's person or property from injury. The law further sanctions the mutual and reciprocal defense of those who stand in the near relation of husband or wife, parent or child. It is lawful to repel unlawful force by force, for the fundamental law in such cases is that one has a primary right to stop injury to oneself, to one's family, or those who rightfully look upon one as a protector. But it is an essential principle of law that we must not use more force than is necessary for self-defense. The law of self-defense is founded on necessity, and one in order to avail himself of this defense in law must show belief, and the reason to believe, that there was imminent danger to life, or of receiving bodily harm, and that as a reasonable person no other means of defense would be effectual; the danger must be apparent and imminent and either existing at the very time, or reasonably believed to be so. Threats alone do not justify or excuse homicide; there must be some actual demonstration of an intent to take life, or inflict bodily harm in order to establish self-defense to the extent of taking a life. In cases of mere assault it is generally held that the right of self-defense does not arise until reasonable effort has been made for protection. One who is in legal possession of property has the right to defend the same against one who manifestly intends or endeavors by violence to commit a felony, and may under certain exigencies in such defense kill his adversary. (See MANSLAUGHTER). An officer of the law authorized to make an arrest has the right to use necessary force, and if the person whom he is attempting to arrest, by resistance, brings violence upon himself, this cannot be made to justify the killing of an officer. In many of the States the principles of law respecting right of self-defense is the subject of statutes. (See ASSAULT; CRIMINAL LAW; MURDER; HOMICIDE). Self-defense in boxing is termed the "manly art." it being held that it is every man's

duty to know how to defend himself with his natural weapons in case of assault. It comprises a training in sparring or warding off blows, both fair and foul, and is a valuable acquirement taught in the United States navy. See BOXING.

SELF-DENYING ORDINANCE, in English history a measure carried through the British Parliament in 1645 by the influence of Cromwell and the Independents, by means of which generals who were either less efficient or but half-hearted in the cause were removed from the command of the army. After Manchester's lack of energy at the second battle of Newbury (October 1645), Cromwell had determined on a change of tactics, and attacked Manchester in Parliament, but he soon found the more sweeping measure a better means toward his ends. The lords threw out the measure, whereupon the Commons proceeded to form a new army under Sir Thomas Fairfax as general-in-chief. The Lords now passed the measure with some alterations and called on all existing officers to resign. Thus Essex, Waller and Manchester were disposed of, while Cromwell was specially reappointed to the command of the cavalry as lieutenant-general. For a similar measure, but one suicidal to good government, in the history of the French Revolution, see MIRABEAU; ROBESPIERRE.

SELFRIDGE, Thomas Oliver, Jr., American naval officer: b. Charlestown, Mass., 6 Feb. 1836. He was graduated from the United States Naval Academy 1854, and six years later was promoted lieutenant. During the Civil War he was on board the *Cumberland* when she was sunk by the *Merrimac*, and commanded the *Cairo*, an ironclad, which was blown up in Yazoo River. He had command of a battery at the capture of Vicksburg, and was in both attacks on Fort Fisher. In 1869 he was promoted to commander, and superintended the surveys for the inter-oceanic canal across the Isthmus of Panama. He was a member of the International Congress at Paris 1876. From 1881 to 1885 he was in charge of the Newport torpedo station, when he invented a method for protecting ships from torpedoes. He became rear-admiral in 1896 and was retired 6 Feb. 1898.

SELIGMAN, Edwin Robert Anderson, American political economist: b. New York, 25 April 1861. In 1879 he was graduated at Columbia University, from which he received the degrees A.M. and LL.B. in 1884, Ph.D. in 1885 and LL.D. in 1904. After graduation at Columbia he spent three years at the universities of Berlin, Heidelberg, Geneva and Paris. He was made prize lecturer in political economy at Columbia in 1885, adjunct professor of political economy from 1888 to 1891 and full professor until 1904, when he became McVickar professor of political economy. Dr. Seligman served on the committees of 70, of 250, and secretary of the committee of 15, New York; was member of the mayor's advisory committee on taxation and finance of 1905 and of the special State tax commission of 1906. In 1908 he was member of President Roosevelt's Committee on statistical reorganization, and from 1905 to 1910 was chairman of trustees of the bureau of municipal research. In 1914–16 Dr. Seligman was chairman of the mayor's tax committee, in 1902–04 he was president of the American Economic Association, and in 1913–15 of the National Tax Association. He is president of the Society for Ethical Culture and is member of very many learned societies, American and foreign. He also edits the *Political Science Quarterly* and the 'Columbia Studies in History, Economics and Public Law.' Dr. Seligman's works include 'Railway Tariffs' (1887); 'Finance Statistics of the American Commonwealth' (1889); 'The Shifting and Incidence of Taxation' (3d ed., 1910); 'Progressive Taxation in Theory and Practice' (2d ed., 1908); 'The Social Evil' (2d ed., 1912); 'Essays in Taxation' (8th ed., 1913); 'Two Chapters on Mediæval Guilds of England' (1887); 'Economic Interpretation of History' (2d ed., 1907); 'Principles of Economics' (7th ed., 1917); 'The Income Tax' (2d ed., 1914). Other publications are to be found in the proceedings of the American Economic Association, the National Tax Association, the American Association of University Professors, and in the issues of the *Political Science Quarterly*, the *Quarterly Journal of Economics* and the *British Economic Journal*.

SELIGMAN, Joseph, American financier. b. Bayersdorf, Bavaria, 22 Sept. 1809; d. New Orleans, 25 April 1880. The eldest of eight brothers, all of them later to be united in a banking firm, with branches throughout the world, his attention was first directed to medicine and theology, but his tastes soon developed in other lines. In his 17th year he came to America and entered the employ of Asa Packer (q.v.) in Pennsylvania as cashier. He went next to Greensboro, Ala., where he opened a store, his success encouraging two of his brothers to settle in Watertown, N. Y., about 1841. In 1848, the rest of his family having emigrated, he removed to New York and organized with them an importing house which was soon among the most prominent in its line. When the Civil War began, the Seligmans established the banking firm of J. and W. Seligman and Company, with branches in London, Paris, Frankfort and San Francisco, each in charge of one of the brothers. Joseph was offered the secretaryship of the treasury by President Grant, who felt entire confidence in his financial ability and patriotism, which had already done so much to maintain the national credit.

SELIM I, sē'lim or sē-lēm', sultan of Turkey: b. about 1465; d. Constantinople, 22 Sept. 1520. He was the son of Bajazet II, whom he succeeded in 1512 and subsequently poisoned. To secure himself on the throne he murdered his two brothers, Ahmed and Korchud, and likewise his nephews, after massacring about 40,000 Shiites in order to rid his country of a Mohammedan sect to which he was inimical. He went no further, however, than the conquest of Diarbekir and Kurdistan. He next made war against the Mamelukes of Egypt, and in 1516 obtained a victory which left him master of Syria. Following up his victory by marching against Touman Bey, he routed the Mamelukes in the plains of Gaza, and of Rudania in the following year, and then entered Cairo without opposition. Touman Bey and many others were put to death, and Egypt, which had been an independent empire since the time of the

Crusades, was incorporated with the Ottoman Empire. The title of *iman* and the standard of the Prophet were at this time granted to Selim by the last descendant of the Abassides, who at that time was residing in Egypt, and in consequence of this concession the sultans of Constantinople became the chiefs of Islam, the representatives of Mohammed. Owing to this proceeding Arabia acknowledged his supremacy. He was succeeded on the throne by Solyman I.

SELIM II, sultan of Turkey: b. 1524; d. 12 Dec. 1574. He succeeded his father, Solyman II, in 1566. The chief events of his reign were his capture of Cyprus from the Venetians in 1570 and Tunis from the Spaniards in 1571. In that year occurred the great naval battle of Lepanto in which he suffered defeat at the hands of the combined Spanish and Italian fleets.

SELIM III, sultan of Turkey: b. 14 Dec. 1761; d. 8 May 1808. He succeeded his uncle, Abdul-Hamid I, in 1789, at which time a war was in progress with Austria and Russia. The Turks were defeated, and in 1791 Selim was compelled to cede Choczim to Austria, and in the following year he signed the Peace of Jassy, which required the surrender to Russia of all Turkish possessions beyond the Dniester. He formed an alliance with Russia and England at the time of the French expedition into Egypt in 1798. Egypt was restored to Turkey by England after a temporary loss and peace was concluded with France in 1802. Selim now entered with great ardor upon a system of reforms; he established cannon foundries, and organized a corps of troops, which he armed, clothed and exercised in European fashion. This proceeding, however, was looked upon with jealousy by the people who burst into open revolt in 1807. The attempts to quell the rebellion were unavailing; the rebels marched upon Constantinople, and compelled Selim to yield the throne to his cousin, Mustapha IV. An attempt afterward made by Mustapha-Baraiktar to reinstate Selim ended in failure, and he died by assassination.

SELINUS, sē-lī'nŭs, Sicily, an ancient Greek colony, founded probably about 628 B.C. on the southwest coast of the island. Its great power and wealth and the rich treasures of its temples are mentioned by Thucydides. Its disputes with Segesta were said to be one of the causes leading to the Athenian expedition of 415 B.C. and it was conquered by the Carthaginians in 409 B.C. and in 249 B.C. destroyed by them. There are still important ruins of ancient Greek temples here, and valuable sculptures belonging to them have been preserved. Consult Baedeker, K., 'Southern Italy and Sicily' (16th Eng. ed., Leipzig 1912); Gardner, E. A., 'A Handbook of Greek Sculpture' (London 1911); and Koldewey, R., and Puchstein, O., 'Die griechischen Tempel in Unteritalien und Sicilien' (Berlin 1899).

SELISH INDIANS. See SALISHAN INDIANS.

SELJUKS, sĕl-jooks', a Turkish family which derived its name from Seljuk, the chief of a small tribe of the Hoei-He, which had gained possession of Bokhara and the surrounding country in the 9th century of our era. During the 11th and 12th centuries the Seljuks founded various dynasties in Mesopotamia, Persia, Syria and Asia Minor. Among the most distinguished of these were the following: (1) The *Seljuks of Iran* or Bagdad, who ruled at Bagdad and Ispahan. This dynasty was the most powerful of them all, and boasted the most illustrious princes. The founder was Togrul Beg, a grandson of Seljuk, who in 1038 made himself master of Khorassan, a Persian province, assumed the title of sultan and obtained from the caliph of Bagdad, whose daughter he married, the dignity of governor-general or *emiral-omrah*. He subsequently completed the conquest of Persia by the reduction of Irak-Arabi and Mosul about 1061. He died in 1063, and of his successors may be mentioned Alp-Arslan (1063–73), who vanquished and made prisoner the Greek emperor Romanus; Melek-Shah (1073–93), who was the most powerful prince of the dynasty, and by means of his generals conquered and annexed to his empire Arabia, Asia Minor, Armenia, Syria and Palestine, and in the administration of the empire was signally aided by his minister Misam-el-Moulk, who was distinguished for the wisdom and moderation with which he regulated the affairs of the vast empire, and for the encouragement he gave to the arts and sciences; Mohammed-Shah (1105–18), who carried on successful wars in India and against the Crusaders; and Sanjar, who reigned from 1118 to 1158, and was one of the most illustrious of the Mohammedan princes. This dynasty became extinct in 1194 with Togrul-Shah, who was vanquished by Tekesh, sultan of Kharizm. (2) The *Seljuks of Kerman*, who ruled in the three provinces of Kerman, and never acquired the same distinction as the preceding. Founded by Kaderd, a nephew of Togrul-Beg, to whom the latter in 1039 confided the administration of these provinces. The dynasty subsisted till 1091. (3) The *Seljuks of Aleppo*, in Syria, founded in 1079 by Tutush, a brother of Malek-Shah, and to whom the latter entrusted the administration of Syria. This dynasty became extinct in 1114. (4) The *Seljuks of Damascus*, in Syria, founded in 1096 by Dekkak, a son of Tutush, who possessed himself of the city of Damascus, and whose successors reigned till 1155. (5) The *Seljuks of Iconium*, or of Asia Minor, founded by Soliman-ben-Kutulmish, one of the great-grandsons of Seljuk, to whom the Sultan Kalek-Shah granted a territory in Asia Minor. This was the longest lived of all the Seljuk dynasties. Under the reign of Alla-ed-Din II, one of the last princes of the dynasty, the Turk Osman distinguished himself as chief captain. His descendants it was who founded the dynasty of Osman in Asia Minor. The whole of the extensive empire of the Seljuks now fell under Mongol domination. Consult also Mirchond's 'History of the Seljuks,' which has been translated from Persian into German (Giessen 1838).

SELKIRK, Alexander, Scottish sailor: b. 1676; d. 1721. In May 1703 he joined Dampier's privateering expedition to the South Seas, and sailed as master in the Cinque Ports under Captain Stradling. In consequence of some difference with his commander he was put ashore on the island of Juan Fernandez (Más-á-Tierra) off the Chilean coast, and remained in his solitude till he was taken away by Capt. Woods Rogers, in January 1709. Some account of his residence was published by Steele in the

Englishman (No. 26; 3 Dec. 1713), in Rogers' 'Voyage Round the World' (1712), and in Cooke's 'Voyage to the South Sea and Round the World' (1712); but there is no reason to believe that he had any papers or journal of any sort. He is known as the prototype of the 'Robinson Crusoe' (1719) of Daniel Defoe (q.v.), who apparently derived such information as he had from Steele, Rogers and Cooke. Little of the details of the famous narrative, however, is derived from Selkirk's adventure. Consult Howell, 'Life and Adventures of Alexander Selkirk' (1829); Sutcliffe, 'Crusoniana' (1843); Wright, 'Life of Defoe' (1894).

SELKIRK, Thomas Douglas, 5TH EARL OF: b. Kirkcudbrightshire, Scotland, June 1771; d. Pau, France, 8 April 1820. He was educated at Edinburgh University, and in 1799 succeeded his father in the earldom. He was active in the promotion of the emigration movement to the Red River and the colony established there was known as the Earl of Selkirk's Settlement. He published 'Sketches of the British Fur Trade' (1816); 'The Red River Settlement' (1817).

SELKIRK, Canada, town and capital of Selkirk District in the province of Manitoba, on Red River of the North, 23 miles north of Winnipeg and on the Canadian Pacific Railroad. The town has a summer resort business, considerable fishing interests, and there are large cold storage plants and government shipyards and dry docks. Pop. (1921) 3,722.

SELKIRK MOUNTAINS, a range of the Rocky Mountains, in British Columbia, from about lat. 52° to 48° N. The Columbia River is on the eastern side for some distance, and the Canadian Pacific Railroad crosses the range between the peaks Sir Donald and Glacier House at an altitude of 4,300 feet.

SELLERS, sĕl'ĕrz, **Coleman,** American engineer: b. Philadelphia, Pa., 28 Jan. 1827; d. 28 Dec. 1907. He obtained a degree at Stevens Technological Institute and was professor of engineering practice there from 1886. He was chief engineer of the Niagara Falls Power Company, and chief mechanical engineer of the Canadian Niagara Power Company. He made numerous inventions in mechanical appliances, was a member of many American and foreign scientific societies and was widely known as a consulting engineer.

SELLERS, Matthew Bacon, American aeronautical engineer: b. Baltimore, Md., 29 March 1869. He was educated in France and Germany, took his LL.B. at Harvard University in 1902 and later studied at the Lawrence Scientific School, Harvard, and at the Drexel Institute, Philadelphia. He has been engaged in aero-dynamic research since 1900; was appointed a member of the Aerodynamic Laboratory Committee by President Taft in 1912; and in 1915 became a member of the Navy Consulting Board. He was the first to determine the lift and drift of arched surfaces by means of the "wind tunnel"; and he invented the lightest aeroplane in the world.

SELLERS, William, American mechanical engineer and manufacturer: b. Upper Darby, Pa., 19 Sept. 1824; d. 1905. He was apprenticed to a machinist, and in 1848 became a member of the firm Bancroft and Sellers, which in 1855 became William Sellers and Company, manufacturers of tools. He made many improvements in tools and invented many new appliances. He suggested the first formula ever offered for screw threads and nuts, which has since become standard in United States and Europe. He was president of Franklin Institute in 1864–67. He became president of the Edge Moor Iron Company in 1868, and in 1873–87 directed the Midvale Steel Company, Nicetown, Pa., manufacturing materials for small arms and ordnance for the government. He was elected to the National Academy of Sciences in 1873.

SELLERS, Col. Mulberry, the name of a character in the novel, 'The Gilded Age,' by Mark Twain and Charles Dudley Warner. He was a visionary Southern speculator, and was created on the stage by John T. Raymond.

SELLEW, Walter Ashbel, American Methodist Episcopal bishop: b. Gowanda, N. Y., 27 Feb. 1844. In 1866 he was graduated at Dartmouth, from which he received the degree of A.M. in 1869. In 1872 he was ordained to the ministry of the Free Methodist Church; held pastorates successively at Tonawanda, N. Y., Rochester, N. Y., Spring Arbor, Mich., Dunkirk, N. Y., Gerry, N. Y., Allegany, N. Y., and Buffalo. In 1887–98 he was presiding elder at Chautauqua, Allegany, Buffalo, Oil City, Bradford and Pittsburgh districts. On 15 Oct. 1898 he was elected bishop. He is treasurer of the Gerry (N. Y.) Home for Aged Persons and the Gerry Orphanage. He is also president and treasurer of the A. M. Chesebrough Seminary, North Chili, N. Y.; is member of the executive committee and of other governing boards of the Free Methodist Church. He made an official missionary tour around the world in 1906 and again visited China and Japan in 1910. Bishop Sellew published 'Clara Leffingwell, a Missionary' and other religious publications.

SELLSTEDT, sĕl'stĕt, **Lars Gustaf,** American painter: b. Sundsvall, Sweden, 30 April 1819. He came to the United States in 1834, and subsequently served in the United States navy. After settling in Buffalo, 1842, he devoted himself to the study of art, and in 1875 was elected a National Academician.

SELMA, Ala., city, county-seat of Dallas County, on Alabama River, at the head of year-round steam navigation, and on Louisville and Nashville, Southern Railway and Western Railway of Alabama, 50 miles west of Montgomery, 158 miles north of Mobile and 98 miles south of Birmingham. It has steamer connections with Mobile, is located in a rich agricultural section, known as the Black Soil Belt. Cotton, livestock and forage crops are the chief products. The principal industrial establishments are cottonseed-oil mills, cotton factories, iron works, railroad shops, woodworking plants and brickyards. It is the jobbing centre for a large territory and markets a great amount of cotton. Educational institutions include Alabama Methodist Orphanage, Convent of Mercy, Carnegie library and a well-equipped public school system. Selma University for negroes is also located here. The four banks, two national and two State, have a capital and surplus of over $2,000,000. During the Civil War the city was the centre of military operations, and had a Confederate navy yard, arsenal, powder works and artillery foundries. It was captured by the Union forces on 2 April 1865, when the army under General Wilson burned the business district. Pop. (1920) 15,589.

SELMA (Ala.), Battle of, an engagement of the Civil War, 2 April 1865, one of the battles of General Wilson's cavalry raid in the operations against Mobile. The Union cavalry camped at a point 19 miles north of Selma on 1 April and on the morning of the next day began the movement against the town. One division advanced from the north on the Summerville road, and a second division from the northeast on the Burnsville road, while a third division was dispatched to burn railroad bridges, trestles, stations, etc., as far as Burnsville. The troops were in position before Selma by 4 P.M. and, dismounting, assaulted and carried the works at a single charge, the distance over which they charged, exposed to the enemy's fire, being 600 yards. The Selma fortifications consisted of a bastion-line with a radius of three miles; the Confederate force on the line against which the charge was made was over 1,500; the Union force engaged numbered 1,550. The Federals captured 31 field-guns, a large number of prisoners and quantities of stores of all kinds. Consult 'Battles and Leaders of the Civil War' (Vol. IV).

SELOUS, Capt. Frederick Courtney, famous big game hunter: b. London, 31 Dec. 1851; killed in action, East Africa, 5 Jan. 1917. Of mixed French, English and Scottish parentage, he was educated at Rugby, Neuchâtel and Wiesbaden, and at 19 set out for Africa to become an elephant hunter. After spending a time on the Kimberley diamond fields he entered the wild Matabele territory (now Southern Rhodesia) and obtained permission from the savage chieftain Lobengula to carry out his object. By the time he was 25 Selous was known as the most daring and successful ivory hunter in Africa. Nor did he restrict his activities to elephants alone; lions, hippo and rhinoceroses fell to his unerring rifle. In 1889 he traveled down the Zambesi to the sea and in 1890 led the pioneer expedition of the Chartered Company into Mashonaland and secured that territory for Britain. He fought in both the Matabele wars, and in later life resumed his hunting adventures. In 1909–10 he organized and accompanied Colonel Roosevelt's hunting expedition in British East Africa. Though over 60 years of age he offered his services for the war; was gazetted lieutenant in the Royal Fusiliers in 1915 and captain a few months later. In September 1916 he received the D. S. O. "for conspicuous gallantry, resource and endurance." Selous wrote 'A Hunter's Wanderings in Africa' (1881), a book regarded as a classic on hunting, and summarized his vast stories of knowledge about African wild game in 'African Nature Notes and Reminiscences' (1908). He also published 'Travel and Adventure in Southeast Africa' (1893); 'Sunshine and Storm in Rhodesia' (1896); 'Sport and Travel, East and West' (1900), and 'Recent Hunting Trips in British North America' (1907). Selous was the original model of 'Allan Quartermain' in Rider Haggard's romance of that name. His eldest son, Capt. F. H. B. Selous, attached to the Royal Flying Corps, also fell in action, on 4 Jan. 1918. A brilliant scholar and a fine athlete, he had been awarded the Military Cross and the Italian Silver Medal of Military Valor. He was 19 years old.

SELUNGS, a race of men, now few in number, and of doubtful affinities, but usually classified as Indonesian, inhabiting the Mergui Archipelago and other islands along the eastern coast of the Bay of Bengal. They live almost wholly in boats made of palm-leaf ribs sewed together by threads of coir and subsist almost exclusively on sea-food, to which fact is attributed the prevalence of leprosy among them. Their principal industry is the gathering of edible birds' nests from the towering cliffs of granite by means of immensely long bamboo ladders. They also gather some mother-of-pearl and other salable shells with which they occasionally come to the ports on the mainland to trade for cloth, etc. They are despised by both the Burmese and Malays, with whom they most often come into contact.

SELVAGE. See GOUGE.

SELWYN, sĕl'wĭn, **Alfred Richard Cecil,** Canadian geologist: b. Kilmington, Somerset, England, 28 July 1824; d. 1902. In 1845 he was appointed assistant on the Geological Survey of Great Britain and in 1852 director of the survey of Victoria, Australia, which was not completed until 1869, when he was appointed director of the Canadian survey, completed in 1895. He also investigated the coal and gold fields of Tasmania in southern Australia in 1854–59. He is a Fellow of the Royal Society. His writings include, beside some odd volumes of reports of geologic and natural history survey, portions of Stanford's 'Compendium of Geography and Travel.'

SELWYN, George Augustus, English wit and politician: b. Gloucestershire, 11 Aug. 1719; d. London, 25 Jan. 1791. He was educated at Eton and Oxford, but quitted Oxford before graduating on account of a reputed insult to the Christian religion. He was appointed to several offices at the mint involving no work and bringing him a small salary. In 1747 he entered Parliament for Ludgershall and from 1754 to 1780 sat for the city of Gloucester. He never spoke at Parliament, but his vote being always cast with the court party secured him lucrative appointments. He was a famous wit at the clubs and an intimate of the Duke of Queensbury, Horace Walpole and Lord Carlisle. Consult Jesse, 'George Selwyn and His Contemporaries' (1843).

SELWYN, George Augustus, English bishop: b. 5 April 1809; d. Lichfield, 11 April 1878. He was educated at Eton and at Cambridge; rowed in the first inter-university boat race (1829). His remarkable powers as an athlete were found very serviceable in after life. In 1841 he was consecrated bishop of New Zealand and Melanesia, a territory since then divided into seven dioceses. On the voyage out he studied Maori and navigation and in his own vessel visited every portion of his diocese before setting about the work of organizing it. A visit to England in 1854 brought back John Coleridge Patterson, afterward bishop of Melanesia, where he was murdered by the na-

tives. In 1867 Bishop Selwyn attended the first Pan-Anglican Synod at Lambeth and was appointed bishop of Lichfield. He was present at the General Convention of the American Episcopal Church at Baltimore in 1871.

SELWYN COLLEGE, Cambridge, England, founded in 1882 in memory of George Augustus Selwyn, bishop of Lichfield, is an institution meeting the requirements of Anglican theological students, on a more economical basis than those of the older established colleges, "combined with Christian training according to the principles of the Church of England."

SEMANTUS (SEMASIOLOGY, or the **SCIENCE OF MEANINGS).** See LANGUAGE, SCIENCE OF.

SEMAPHORE, a term originally applied to the moving arm of a signaling post in a system of coast telegraphy adopted by the French, and subsequently to any kind of signaling arms moving round pivots placed at or near their extremities. The semaphore, from the ease and rapidity with which the movable arms could be worked, was much superior to any telegraph previously in use. The French semaphores consisted of two or three movable arms, mounted on posts and turning upon separate pivots, one above the other. These were mounted on the top of towers, erected in commanding positions at distances of from 5 to 10 miles apart. When signals were made at one tower they were read off at the next by means of a powerful telescope, and then transmitted to a third, and so on, if necessary, to the end of the series. In this way a message might be dispatched with great rapidity. In 1809 Captain Pasley, an English officer who had previously constructed what he termed a polygrammatic telegraph, saw the French semaphore, and applied the principle of it to his own telegraph. As thus modified it consisted of three opposite pairs of arms pivoted on a post at certain intervals, representing hundreds, tens and units. Till 1816 the British Admiralty had employed a telegraph which had been submitted in 1795 by Lord George Murray and which consisted of several shutters placed in a vertical frame, by the opening and closing of which the signals were made. In the year named it was determined to substitute, for these telegraphs, semaphores constructed on the principle of those used in France, with certain improvements suggested by Sir Home Popham. In Popham's semaphore there were only two arms, but these being upon separate pivots, though on the same post, each of them could be made to assume six different positions, and in combination the two could give 48 signals, a number more than sufficient to express all the letters of the alphabet, together with the nine digits. The vertical post of this semaphore was a hollow hexagonal mast, which passed through the roof of the tower, and being fixed upon a pivot it could be made to turn so as to display its signals in any direction. It was not till the introduction of the electric telegraph that government semaphore stations were abandoned. For the modern semaphore, see BLOCK SIGNAL SYSTEM.

SEMBRICH, zĕm'brĭH, **Marcella,** Austrian opera singer: b. Lemberg, Galicia, 15 Feb. 1858. She studied violin and piano at first, her master on the latter instrument being Franz Liszt. When it was discovered that she had a remarkable voice she went to Milan to study with Lamperti, and made her first appearance at Athens in 'I Puritani.' Shortly afterward she became attached to the company of the Royal Opera House, Dresden, and remained until 1880. That year she appeared first in London. She came to the United States in 1883, since which time she has reappeared here in several seasons of concerts and opera. In 1903–04 she was the leading coloratura soprano at the Metropolitan Opera House. Her repertory embraces a wide range of Italian operas.

SEMECARPUS, a genus of trees of the *Anacardiaceæ,* containing about 35 species. The marking-nut tree (*S. anacardium*) is the most important species. The pericarp of its fruit furnishes a juice greatly used in India for printing cotton cloth, for ink and for dye. It is also employed for warding off white ants and for a medicine in rheumatism, warts and leprosy. When pounded and boiled in rape-seed-oil it stays putrefaction when started in hides. The seed itself, which is called Oriental cashew-nut or melacca bean, and the fleshy pedicel are eaten by the natives. The resin of this species yields Sylhet varnish and an oil derived from it mixed with the milk of euphorbia is made into birdlime. This species is cultivated to a limited extent in southern Florida.

SEMELE, sĕm'ĕ-lē, according to Greek mythology, the mother by Zeus of Dionysus or Bacchus, the god of wine.

SEMERARA, sā-mā-rā'rā, (1) A group of islands of the Philippine Archipelago lying two miles south of Mindoro, in the channel between Mindoro and Panay. The group consists of eight islands and a number of small islets; area, 60 square miles. The people are Visayans, and are mostly engaged in turtle and trepang fishing. Pop. 500. (2) The largest island of this group, area, 35 square miles. It is hilly, the highest elevation being 512 feet. The west coast is indented with several bays, but none afford good anchorage; there is sheltered anchorage to the south of the island during the northeast monsoon. Coal of good quality is found, especially in the north.

SEMI-AUTOMATIC GUNS. See ORDNANCE.

SEMINOLE (sĕm'ĭ-nōl) **INDIANS** (Creek Simanoli, "separatist," "renegade"). An important tribe of the Muskhogean stock of American Indians. The name was originally applied to those Creeks and Hitchitis on lower Chattahoochee River who left the main body about 1762–68 and removed to the peninsula of Florida, in the territory that had been occupied by the Appalachis who were practically exterminated some 60 years before, although some Creeks, who later became part of the "Seminoles," have resided in the southern part of Florida since the middle of the 16th century. The separation of the Creeks and Hitchitis from their northern kinsmen was due chiefly to overpopulation of the older towns, followed by turbulent and undesirable elements, criminals and desperadoes (whence the opprobrious application of the term Lemicca by the Creeks who remained at home, and the forcible migration of others owing to the encroachments of

civilization). The Hitchiti elements consisted principally of Mikasukis; there were also probably some Yamasis, and certainly some Yuchis and negroes. The Seminoles are known to history chiefly through their two wars with the United States — the first in 1817–18, provoked by the upper Creeks, the other in 1835–42, which was the bloodiest and most furiously contested struggle with Indians in which the government has ever engaged, resulting from the refusal of a part of the Indians to remove to the Indian Territory, under the provisions of a treaty agreed to by them in 1834, in which they ceded their lands in Florida to the United States. On the final surrender of the hostiles, in 1842–43, the Seminoles (with the exception of some who fled to the swamps) to the number of 3,824, were moved to the West, where they now form one of the five civilized tribes of the Indian Territory, the others being the Cherokees, Choctaws, Chickasaws and Creeks. The Seminoles in 1915 numbered 3,129 (including some negroes and adopted white). The total area of their nation comprised 365,852 acres, of which 1,932 acres were reserved for town sites, railroad rights of way and other purposes. With the exception of a few minor details the tribal affairs of the Seminole nation were practically completed in 1915 and the nation incorporated in the United States.

SEMINOLE WAR, the second of the two wars in which the Seminole Indians of Florida engaged against the United States, the first having been a short conflict in 1817–18, which was ended by General Jackson, who destroyed villages of the Indians and wholly subdued them. The second, which is that usually referred to as the Seminole War, began in 1835 and ended in 1842, and was the fiercest of all wars waged by the United States against Indians. It began in consequence of the refusal of a part of the tribe to make a cession of its lands in Florida and submit to removal to the Indian Territory, in accordance with the terms of a treaty ratified in 1834. On the Indian side the war was at first conducted by the celebrated chief Osceola (q.v.), with whose name it is largely associated; and on the part of the United States it was carried on by Scott, Taylor, Jesup and other commanders. After a protracted struggle the Indians were completely subjugated, and in 1843 about 4,000 of them were removed, those who arrived in the Indian Territory forming one of the five civilized nations now located there.

SEMIPALATINSK, sĕ-mē-pä-lä-tĭnsk', or **SEMIPOLATINSK,** Asia, in Siberia, (1) capital of a province of the same name, situated on the left bank of the Irtish River. It is fortified and the chief points of interest are the government buildings, offices, mosques, churches, bazaars and barracks. There is considerable trade with Kirghiz, Tashkend, Khokand, Bokkara and Kashgar.

(2) The province of Semipalatinsk covers an area of 178,128 square miles. The Alexandrian Mountains separate it from Turkestan on the south. Several other ranges traverse its territory. The principal streams are the Irtish, Ili and Chui. The lakes: Issik-Kul, Ala-Kul and Balkash. Cattle raising forms the only industry of the inhabitants. Some lead and copper, etc., occur. Its climate is comparatively mild. Apricots and apples are spontaneous. Pop. about 690,000.

SEMIPALMATED SANDPIPER. See SANDPIPERS.

SEMIRAMIS, sĕ-mĭr'ą-mĭs, a fabulous queen of Assyria. She was a daughter of the fish-goddess Derceto of Ascalon, in Syria, by a Syrian youth. Being exposed by her mother, she was miraculously fed by doves until discovered by the royal shepherds, the chief of whom, Simmas, took her to his own house and brought her up. Her surpassing beauty, according to Ctesias, having attracted the notice of Onnes, the governor of Nineveh, he married her. She subsequently accompanied her husband to the siege of Bactra, where by her advice she assisted the king's operations. Captivated by her abilities as well as by her beauty, Ninus, the founder of Nineveh, asked her of her husband, who refused to yield her, and when Ninus added threats to entreaties hanged himself. As queen of Assyria, Semiramis built Babylon, adding fine buildings and hanging gardens. She led campaigns against Persia, Egypt, Libya and Ethiopia. Finally with a host of 3,000,000 foot, 500,000 horse and 100,000 war-chariots she engaged in battle with King Stabrobates and was defeated in a battle on the Indus with the loss of one-third of her forces. Upon this it is said she vanished in the shape of a dove or slew herself. Evidently she has no existence in history. She is the goddess of war and of love, the Istar of the Assyrians, to whom the dove was sacred. Consult Lenormant, 'La Legende de Semiramis' (1873).

SEMITES, a name given by J. G. Eichhorn in 1787, in his 'Introduction to the Old Testament' (2d ed., i, 15) to a group of nations allied in language, religion, manners and physical features, represented in Gen. x, as descended chiefly from Shem, a son of Noah. Their habitat is Abyssinia, Arabia, Palestine, Phœnicia, Syria and the countries of the Euphrates and Tigris. Into those lands, according to one theory which is supported by Lenormant and others, there had preceded them an immigration of Cushites of the Hamitic race, who, proceeding from central Asia, occupied not only the lands that afterward became Semitic, but also the Nile Valley. Their Hamitic language and civilization the Semites are said to have adopted. In language the Semites do show some affinity with the Berbers and the inhabitants of the Nile Valley, and Gen. x does, for political and geographical or other reasons, distribute the sons of Ham and Shem in a peculiar manner. But the increasingly prevalent theory is that not less than 4,000 years B.C. the Semites migrated as nomadic tribes, probably from Arabia into Mesopotamia. There they found a Turanian population dwelling in cities built of brick, under the regular government of priest kings, skilled in the use of metals, using the cuneiform mode of writing, and comparatively far advanced in literature and culture. The hold of the Semites on Shumir, the lower, more fertile and more thickly inhabited part of the Euphrates Valley, was not at first so strong as on Accad, the upper part. In 3800 B.C. the Semitic adventurer Sharrukin usurped the kingdom of Accad. In Elam also the Turan-

ian population was early overpowered by the intruding Semites, who came to form the upper strata of society. In 2280 B.C. the Semite Khudur-Nankhundi of Elam invaded and conquered Shumar and Accad, founding the Elamite line of princes; and about 2200 B.C. one of his successors, Khudur-Lagamar (Chederlaomer), carried his conquests as far as Palestine (Gen. xiv).

These painful and oppressive impulses, and probably others like them, seem to have occasioned emigrations of many Semites. Some proceeded toward the northwest, reached the Mediterranean Sea, founded Sidon, Tyre and other cities and became known afterward as Canaanites or Phœnicians. Later, from Ur went others in the same direction, settled behind the Phœnicians and were afterward known as Israel. Others went north and built cities which developed into the empire of Assyria. While the Semites were in Mesopotamia they used the Turanian language in their public documents till they attained the ascendant in political power; and when afterward they used their own language they continued to use the Turanian cuneiform mode of writing. The Turanian religion also was adopted by the Semites, and mixed with what religion their own primæval tribal religion or totemism had developed into. This amalgamation was consummated by Sharrukin II of Accad about 2000 B.C.

The Semites as a race have a fine physical organization, are mentally quick, clever but not inclined to change, and not persistent in progress. They have been distinguished by a brilliant imagination and love of the beautiful; but have not shone in philosophy or in science. Their literature has neither epic nor dramatic poetry worth notice. Almost their only arts are the sculpture of Assyria, the exquisite glass and pottery and the textile fabrics and embroidery of the Phœnicians. Impatient of restraint, the Semites have not by political aptitude welded together themselves or others into large, compact and enduring commonwealths. They have made their mark on the world in the Phœnician commerce, which visited even the Atlantic shores of Spain and France and drew tin from Britain; in the Phœnician colonies, which, dotting all the coasts and many islands of the Mediterranean Sea as far as Cadiz, and the coast of Asia as far as India, dispensed manufacture, developed primitive navigation (even to the extent of circumnavigating Africa more than 2,000 years before Vasco da Gama), stimulated industry, trade and ingenuity, and radiated the light of material civilization; in the Carthaginian Empire within Europe and Africa; in the exploits of Hannibal; in the dissemination of alphabetic writing, whereof the Phœnician form was the mother of the European and of most Asiatic alphabets, while the alphabet of the great Sabæan kingdom, or of the great and still more ancient Minæan kingdom in Arabia, is apparently the eldest of all alphabets hitherto discovered; in the Babylonian and Assyrian empires; in the Hebrew Bible and the Jewish religion; in the New Testament and the Christian religion; in the Koran and the Mohammedan religion; in the Mohammedan conquests and empire, and in the preservation of culture thereby during the Dark Ages and the Middle Ages. The difficulty of generalizing with exactitude as to the origin and character of the Semites is increased, as Nöldeke has shown, by the fact that we assume that the most important traits of some Semitic peoples are common to all. In reality some striking features which are ascribed to racial influence are due to external conditions of life, which under similar circumstances are also developed among non-Semitic races. Linguistically, too, it is a no less formidable task to understand aright the kinship of the Semites. They are usually divided into two groups — Northern and Southern. The latter include Arabs, Yemenites, Abyssinians; the rest compose the Northern, whose classification is less happy, as their relationship to each other is less close. As to Semitic origins, it is usually held that Arabia was the Semitic cradle-land, with North Africa that of the Hamito-Semitic race. It is now doubted that they originated in certain districts in Armenia, while the ingenious theory of an eminent Italian Orientalist, Guidi, that the lower Euphrates was their home meets equal disfavor. Consult Brinton, 'Races and Peoples' (New York 1890); Ripley, 'Races of Europe' (1901); Barton, 'Sketch of Semitic Origins' (New York 1902).

SEMITIC LANGUAGES, the languages spoken by the nations of whom Shem was considered the common ancestor. The word Semitic comes from the Septuagint form of the name Shem, Shemitic, derived directly from the Hebrew, being much less frequent. The Semitic languages form a group somewhat like the Aryan group, although the relationship of the different languages is much closer. The members of the group do not entirely correspond to the list of the descendants of Shem given in Gen. x, 21–31; Elam, for example, which is included, in x, 22, was not a Semitic people, while the Canaanites, including the Sidonians, who were Semitic, are given in x, 15 among the descendants of Ham. Such facts indicate that the table of nations in Gen. x was not entirely ethnological, but at least partly geographical: the nations were grouped according to their geographical distribution in the time of the writer.

General Divisions.— The Semitic languages are often divided into two main divisions, Northern and Southern. But the former can be divided into three groups, Eastern, Northern and Middle, which are separated from each other by differences very nearly as great as those between the two divisions first mentioned. It seems better, therefore, to recognize the general division as fourfold, into Eastern, Northern, Middle and Southern Semitic languages.

The Eastern Branch.— The Eastern branch includes the Babylonian and Assyrian languages. Assyrian is really a dialect of Babylonian, there being but very slight phonetic differences between the two, although the difference is somewhat greater in the form of the characters. Babylonian is found much earlier than Assyrian and also continues somewhat later. The Babylonian inscriptions thus far found begin probably about 4000 B.C., possibly somewhat earlier, and extend to the capture of Babylon in 538 B.C. Babylonian was also used later as a literary language under the Persian and Greek rulers of Babylonia. Assyrian inscriptions extend from about 1800 B.C to shortly before the fall of Nineveh in 606 B.C.

The Northern Branch.— The Northern Semitic or Aramaic branch includes many languages and dialects, to all of which the general term Aramaic is applied. The oldest Aramaic literature is found in the inscription of Zakkûr, 9th to 8th century B.C., and in the inscriptions from Senjirli, of the 8th century B.C., some words on Assyrian and Babylonian tablets being only a little later. The language of these inscriptions differs very much from the later Aramaic languages and resembles the Canaanite language in many particulars. The Aramaic languages are divided into two principal branches, Western and Eastern, the geographical distribution of which was largely in harmony with these names. Western Aramaic may be called one language, with the following principal dialects: Biblical Aramaic, being the language of portions of the Old Testament books of Daniel and Ezra, and of a few words elsewhere in the Old Testament; Targumic Aramaic, usually so-called, the language of the Palestinian Targums; the similar language of most of the Gemara of the Palestinian Talmud and of the Palestinian Midrashim, which is also found in small parts of the Mishna, and also of the Babylonian Gemara; Samaritan, the language of the Samaritan Targum to the Pentateuch; the language of some Jewish inscriptions and papyri from Egypt, dating somewhat before the time of Christ; the language of the few Aramaic words found in the New Testament; the language of the inscriptions found in Tadmor or Palmyra; and the language of the Nabatean inscriptions found in Idumea and vicinity. The only modern representative of Western Aramaic is the language spoken at the present time by a few people near Damascus, in and near the village of Malula, which is written in the Syriac character but belongs in this class. Eastern Aramaic includes Syriac, Mandaic, being the language of the Christian sect of Mandæans who lived east of the Tigris, and the language of the most of the Babylonian Gemara. Syriac was the language of the Christian Arameans and was employed in an extensive literature, chiefly of an ecclesiastical nature, extending from the 2d to the 13th century A.D., including the translation of the Bible known as the Peshitta. The word Syriac means the same as Aramaic and was adopted by the Arameans from the Greeks, because the word Aramaic had come to be used as meaning heathen. After the separation of the two sects known as the Nestorians and Jacobites, each developed its own dialect, known as the Nestorian and the Jacobite, respectively. The actual dialectical differences are but slight, chiefly in the pronunciation of the vowels. In writing, somewhat different forms of the characters were used and the vowels were represented by entirely distinct systems, in the Nestorian dialect by dots, in the Jacobite by characters borrowed from the Greek. The modern representative of the Nestorian branch is the language used by the Nestorian Christians, in parts of Persia, especially in the city of Urmia and vicinity, in some villages in Kurdistan and in portions of Mesopotamia. This language shows very many changes from ancient Syriac, those in the verb being especially striking, while the vocabulary has received very many foreign words, especially from Arabic, Persian and Kurdish. Further, this language shows forms not found in Syriac, but preserved in other Aramaic languages as well as in some of the other Semitic languages, so that it is evidently descended not from ancient Syriac itself, but from a closely related dialect. There are four principal dialects of modern Syriac, that used in Urmia and vicinity, that of northern Persia and some adjacent regions in Turkey, that of Kurdistan and that of Mosul and vicinity. While the language is the same in all these, yet there are very many dialectical variations. The modern representative of the Jacobite Syriac is the language of Tur Abdin, in western Kurdistan, which is similar to the modern Nestorian language, but with many differences.

The chief general feature that distinguishes the Eastern and Western Aramaic languages is the preformative of the imperfect. This is *y* in all the Western Aramaic dialects, although a few forms with *l* are found in Biblical Aramaic, and *n* in all the Eastern, although Mandaic and the Babylonian Talmud have *l* along with *n*. In modern Syriac the verbal form is so much different that no preformative is used.

The Middle Branch.— The middle Semitic branch is also called Canaanite, for all its languages are often included under the general term Canaanite. The only one of these languages in which much literature has survived is the Hebrew. Nearly all of the Old Testament is in ancient Hebrew. Aside from this, the oldest Hebrew documents are probably about 75 inscribed potsherds found at Samaria in 1910, written in ink by a reed pen, containing brief business memoranda. These are usually ascribed to the time of Ahab, the first half of the 9th century B.C. A small limestone calendar tablet was found at Gezer in 1908 and is assigned to the 8th century. The Siloam inscription is usually dated at about 700, but is possibly much later. Various inscribed Hebrew seals have been found, dating perhaps from the 8th century on. Coins with Hebrew characters are from the 2d century B.C. to the 2d century A.D. New Hebrew or Mishnaic Hebrew is found chiefly in the Mishna, and also somewhat in the Gemara and in related works. Hebrew has continued to be used somewhat by the Jews as a literary language even to the present time, most of the later literature being produced in the Middle Ages. The language as thus used is ordinarily similar to Mishnaic Hebrew. The Phœnician has much that is identical with the Hebrew, while the differences are slight, affecting the vowels more than the consonants, although the vocabulary shows some variations. It is found in inscriptions from Phœnicia and her colonies, prominent among the latter being Carthage, where the language was called Punic. Considerable portions are also found quoted in works of Latin and Greek authors, chiefly in the Pœnulus of Plautus. Most of the Phœnician inscriptions are from the 4th century B.C. and later, some are as old as the 6th century, while the oldest inscription may belong to the 8th century or a little earlier. The inscription of Eshmunazar, from the time of Alexander the Great, is the most important. In this group are also included the Canaanite, Moabite, Ammonite and Edomite languages. The last two are known only from the proper names found in the Old Testament and the inscriptions of other nations,

the Moabite from that source and also from the Moabite stone, written by Mesha, king of Moab, and dating from about 850 B.C. The Canaanite, aside from information given in the Old Testament, is known from glosses found in the Tell el-Amarna tablets (see AMARNA LETTERS) about 1400 B.C. All four are substantially identical with Hebrew, the Canaanite and Moabite, which of course are known more fully than the other two, showing slight dialectical variations. Moabite and Phœnician, like Hebrew, have *waw* consecutive with the imperfect. Some of the Philistine proper names given in the Old Testament are Semitic. It is generally agreed, however, that the nation was not Semitic, but perhaps learned and used the common Canaanite language after their arrival in Palestine.

The Southern Branch.— The Southern Semitic branch is sometimes called the Arabic group, because the Arabic language is its most important representative. Under Arabic may be included ancient or classical Arabic, its descendant, modern Arabic, and southern Arabic, often improperly called Himyaritic, including the closely related dialects of Sabæan and Minæan. The great work in ancient Arabic is the Quran, composed by Mohammed (570–632 A.D.), although a few poems are older than this. Printed modern Arabic is substantially the same wherever found and does not differ greatly from the ancient language. The spoken language, however, is divided into many dialects, of which the most important are those of Syria, Egypt, Mesopotamia, Tunis, Malta and Oman and Zanzibar. Under the general head of modern Arabic may be included the very extensive Arabic literature from soon after the time of Mohammed down to the present time. Sabæan and Minæan are found in inscriptions, chiefly in southern Arabia. These are of uncertain date, although it is now often claimed that the earliest Minæan inscriptions are earlier than 1000 B.C., while the oldest Sabæan are somewhat later. Modern representatives of these dialects are found in the present dialects of the same region, of which little is known, two of them being the Mahrī and the Socotrī. Included in the Southern Semitic branch is also Ethiopic, or more properly Geez. This was probably a descendant of Sabæan. The ancient Ethiopic was the language of Abyssinia. It closely resembles the Arabic dialects, sharing with them some of their most characteristic features, while in many other respects it differs greatly from them. It was the spoken language of Abyssinia till about the 13th century A.D. The earliest known literature comes from about 500 A.D. Most of the literature consists of translations from other languages. The most important documents are the translation of a part of the Bible, made about 500 A.D., and the apocryphal book of Enoch, which is a translation from a lost original. Modern representatives of the language in the same region are the Tigré, the Tigrina and, with extensive incorporation of foreign elements, the Amharic, together with dialects related to the Amharic, such as the Hararī and Gurāguĕ.

The Egyptian language is by some classed as Semitic. It seems evident, however, that that is not the case, but that very early, in prehistoric times, it was subjected to strong Semitic influences, doubtless from invaders coming from Asia.

The Written Characters.— The written character of the Babylonian and Assyrian languages is the cuneiform, the writing being partly ideographic and partly syllabic, but not at all alphabetic. (See CUNEIFORM WRITING). This, however, according to the common view, was not the invention of the Babylonians, but was taken by them from the earlier inhabitants of the land, the non-Semitic Sumerians. It was originally a picture writing, like the hieroglyphics of the Egyptians, but has been so largely conventionalized that in most cases the resemblance to the original picture has been lost. The Assyrian forms, when they differ from the Babylonian, show modifications in the direction of greater conventionalizing and increased regularity. Aside from the cuneiform, all Semitic languages use an alphabet, consisting entirely of consonants, which goes back to the same original forms. Ethiopic is an apparent exception, in that the vowels are written with the consonants, that is, each consonant has six or more different forms according to the vowel following it. These forms have such a resemblance to those of the other Semitic languages, however, and in particular to the Sabæan which is written without vowels, that it is probable that the earliest form contained simply the consonants, and that the modifications of form for the expression of the vowels show a later development. What is commonly regarded as the earliest form of the Semitic alphabet is usually called the Phœnician, a name given to it by the Greeks because they obtained it from the Phœnicians. But the Phœnician alphabet at the time of our earliest knowledge, about the 8th century B.C., was practically identical with the forms found at about the same time among the other Canaanites and the Aramæans. The origin of this alphabet is doubtful, the common view at the present time being that it was derived from certain Egyptian characters, while some regard it as taken from the Babylonian. After the Greeks obtained this alphabet, it passed from them to the Romans and then to the many modern alphabets derived from the Greek and Latin. The earliest inscriptions known in this alphabet are probably the ostraka from Samaria in Hebrew, of the 9th century, the Hebrew Gezer inscription, of the 8th century, the Moabite stone, about 850 B.C., in the Moabite language, a Phœnician inscription of about the same date, the Siloam inscription, about 700 B.C., in Hebrew, the Zakkūr inscription and the inscriptions from Senjirli, about the 8th century B.C., in Aramaic. All these have substantially the same forms. Within the next few centuries two types gradually arose, the old Hebrew and the Aramaic or square characters. The old Hebrew was used in writing Hebrew till the Jews adopted Aramaic as their vernacular, which was at any rate before the time of Christ, when they naturally came to use ordinarily the Aramaic form of character for the Hebrew as well. The Samaritans have always used the old Hebrew form of character, with many changes, especially in the direction of greater elaborateness. The only modern use of this form of character is in the Samaritan of the present day.

The earliest Syriac character, known as the Estrangela, was a cursive writing developed from the Aramaic form. From this came the later Syriac forms, both Nestorian and Jacobite, and also the Arabic characters, including both the Kufic and the Neskhi.

The southern Arabic characters, found in Sabæan and Minæan, differ greatly from those already mentioned, and are perhaps earlier than any other forms which have been found. They are to be traced, however, to the same common character in an early form. The Ethiopic character is a development of the southern Arabic form.

The Ethiopic language and the Assyrian and Babylonian are written from left to right. All the other Semitic languages are written from right to left.

General Characteristics of the Semitic Languages.— The modern Semitic languages and dialects have of course been greatly changed by the influence of the other languages with which they have been brought in contact. These, therefore, should not receive a prominent place in the consideration of the general characteristics of the Semitic languages, although they may offer confirmatory testimony in some particulars. Some of these general characteristics of the ancient Semitic languages may well be noted, keeping in mind a comparison with other languages, especially with the Aryan group. It is not claimed, of course, that the characteristics which will be here named have no similarities elsewhere, but rather that they may fairly be considered general characteristics of the Semitic group, as they could not be of any other group.

The Semitic languages divide the letters into two general classes, consonants and vowels, the consonants being the more important. Roots are composed only of consonants, while the vowels are used, along with consonantal changes, to express modifications of the fundamental root idea. Although the vowels are thus important, it is in a domain entirely subordinate to the consonants. The result of this is that in all the languages except the Assyro-Babylonian and Ethiopic the consonants only were originally written, and the vowels added by means of small marks, for the most part above or below the consonants. In fact, it was only in comparatively late times that the vowels were written at all. The inscriptions, such as those of Phœnicia and of Senjirli, the Moabite stone and the Siloam inscription, have no vowels. In the Assyro-Babylonian the vowels are expressed, but the characters are usually supposed to have been borrowed, as has already been noted. In the Ethiopic the vowels are expressed by slight changes in the form of the consonant, a feature, however, which is probably to be regarded as a late development, although going back to the earliest known literature. The consonants alone were probably originally written.

Originally the Semitic languages were characterized by the possession of a large number of gutterals, some of them very peculiar. In course of time, however, part of these were lost by most of the languages, the Arabic preserving them the most fully.

The Semitic roots are almost entirely triliteral, that is, each consists of three consonants. An occasional root is found which contains four or more consonants, but these are exceptional. On the other hand, the belief is growing that many of the triliteral roots, especially some of the so-called weak roots, were originally biliteral. But here the tendency of the languages toward triliterality is seen plainly from the fact that to a large extent these roots have assumed the appearance of triliterality.

The relation between nouns and verbs is very close. In fact most of the features of inflection are the same in both, the noun being the earlier.

A prominent characteristic of verbal inflection, with many similarities in the nouns as well, is the development of many different stems or conjugations from the same root. These are formed partly by internal change in consonants and vowels and internal additions and partly by external additions. Thus one stem has an intensive meaning, another a causative, another a reflex, etc. In the original Semitic there must have been many different stems. Some have been lost in each language. The Ethiopic has preserved the largest number, next the Arabic, then the Assyrian. These stems afford a very concise way of expressing many different shades of meaning connected with a single root idea, each of which would in most languages require either a compound verb or the addition of separate words for its expression.

The languages use pronominal suffixes attached to nouns, verbs and prepositions. These are really shortened forms of the pronouns. With nouns they have the force of a genitive, with prepositions of a dative and with verbs ordinarily of an objective accusative.

The languages are distinctly objective. The personal standpoint of the speaker or writer counts for little. In the verb, the third person is the simple uninflected form, the starting point of the inflection, it is the first person in the Aryan languages. The present time, the time of the speaker or writer, is of little importance in comparison with the past and future. The use of the tenses is often based upon an assumed standpoint. So also many phases imply the assumption of a standpoint other than that of the writer or speaker.

Certain phenomena may be classed together under the general statement that they show a lack of development in the languages. This is not, however, due to lack of time or of favoring circumstances, because these features are ordinarily found to characterize in a similar way all the languages at all times and under all circumstances. These phenomena indicate rather psychological characteristics of the people, their natures are not complex, they show limitations in some directions. Certain developments which are common in Aryan languages the Semites did not feel to be necessary. Among these characteristics may be mentioned the following:

Most of the Semitic languages have only two tenses, usually called the perfect and the imperfect. Whether these differed in their fundamental meaning from some of the tenses of the Aryan languages is a question on which there is difference of opinion. The later forms of several of the languages developed a present tense from a participle, which is only suggested in the earlier usage. In general the Semitic tense usage is thus much less fully developed than the Aryan. Moods also are relatively undeveloped. They are found only in connection with the imperfect tense, even the impera-

tive being derived from it, and in most of the languages they are not widely used.

The nouns have only two genders, masculine and feminine.

There is an almost entire absence of compound words, both nouns and verbs, except in proper names.

The syntax is in many particulars of a simple and undeveloped kind. There is a strong tendency to leave much in the relation of clauses and sentences to inference. This leads to the very frequent use of parataxis. There is but a small number of particles of every kind. In most of the languages the original case endings have been lost, but there has been no great development of prepositions to take their place. There is also a scarcity of adjectives in most of the languages, so that nouns are often used in their stead.

Relation to the Primitive Language.— No existing language can be called the common mother of the other Semitic languages, nor even the most primitive in every respect. Each of the languages is probably in some features more primitive than any other. But the Arabic preserves far more that is primitive both in grammatical forms and syntactical usage than any other of the languages. This is in spite of the fact that the known Arabic literature is very late. The Arabs in their desert home remote from other nations changed the language less than other peoples in a short space of time. Thus the Arabic preserves the case endings, which have been largely lost in the other Semitic languages, except in the Assyro-Babylonian where they are often used indiscriminately. The Arabic preserves the original endings, sometimes consonants, more often vowels, both in verbs and nouns, which are largely lost elsewhere. The Arabic retains in most cases the original vowels, which in the other languages undergo various changes, such as heightening, shortening (volatilization) and contraction, although the Ethiopic has also retained many of these. The formation of the plural nouns by internal changes, the broken plurals, which is so prominent a feature of the Arabic, is only found elsewhere in Ethiopic. This was probably a primitive feature.

See ARABIC LANGUAGE; ASSYRIA; BABYLONIA; ETHIOPIA; HEBREW LANGUAGE AND LITERATURE; MOAB; PHŒNICIA.

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SEMITIC NATIONS, those nations whose languages were Semitic, and which are consequently supposed to have been racially connected. It is recognized, of course, that language is not an infallible evidence of race, and that the conclusions on that point drawn from it have at least a small degree of uncertainty. But in the absence of much evidence of any other kind, the data supplied from this source must be used as a working basis. (See SEMITIC LANGUAGES). In considering the Semitic nations as a group, the first question is, of course, concerning their primitive home. Primitive is here used only in a relative sense, for the very earliest history of these nations goes back to a time concerning which, in the present state of knowledge, there is no positive information or plausible inference. The consideration of that time would involve a discussion of the origin of the whole human race, which is a question too broad to be entered upon here. By primitive home is meant, therefore, the location of the Semites when they were one people, the common distributing point of the Semitic nations. While entire certainty on this point is not attainable, yet there are some indications which may be followed.

Some have found this primitive home in Babylonia or its vicinity. For this the chief argument is based upon language. A consideration of the words common to all the Semitic languages is thought to point to the conditions prevailing in Babylonia, or in some adjacent country from which Babylonia was the first stopping place of the undivided race. But this argument from language is inconclusive, in view of the possibility of the disappearance from a language of words once common, and also of the borrowing by one Semitic language from another. The fact that the known history of Babylonia extends back to a point much earlier than that of any other Semitic nation has very little to do with the question.

There are many arguments in favor of Arabia, that is, central and northern Arabia, as the primitive home. Arabia is a country which is largely desert, except in the southern part. Such a country, it is said, best explains the racial characteristics. These characteristics, as usually given, are intensity of faith, ferocity, exclusiveness and imagination. It is also said that the Arabs have preserved the Semitic character and characteristics in their purest form. Certainly those characteristics which have just been mentioned are found combined among the Arabs more fully than elsewhere. A desert origin seems, also, to explain most satisfactorily some features of the Semitic languages. This is true especially of the great predominance of gutterals. Such a development of these as was found in primitive Semitic demands good physical powers, which would come from an outdoor life in a pure atmosphere, and plenty of leisure for conversation. These conditions are met in Arabia. In this connection it is important to note that the Arabs have preserved the gutterals more fully than any other Semitic nation, the others having considerably modified their primitive habits of life. Again, it is by some regarded as a universal law that nomads may adopt settled habits of life, but that the reverse process does not take place. This rule perhaps is not invariable, yet it does represent the usual tendency. When, therefore, we find some Semitic nations nomadic and others not, it follows that the nomadic form of life is probably the earlier. For this nomadic form of life the natural location is Arabia. Further, the close resemblance of the Semitic languages to one another, much closer than in any other known group of languages, indicates some of the early conditions surrounding the nation. It suggests that the primitive nation lived in a comparatively limited space for a long period of time before being divided, giving opportunity for much common development of the language and also that it was largely isolated from other nations who would influence the language. Such a country of moderate size, in comparative isolation from other countries, is Arabia alone in the region inhabited by Semitic peoples, or in their vicinity.

Another view is that the primitive home was in Africa. According to this view, however, as ordinarily held, the Semites very early migrated into Arabia and there lived for a long period of time before any division took place. This view would, therefore, make Arabia the centre of distribution for the Semitic nations. Hence the arguments already adduced in favor of Arabia would still be valid upon this view, but additional arguments are presented in favor of going back one step further to an African home. In support of this view the chief argument is that there is supposed to be a racial connection between the Semitic and Hamitic peoples. By Hamitic peoples are not meant the negroes, but the Egyptians, Berbers, etc., although it is by no means certain that the Egyptians are Hamitic. For this racial connection there are two chief arguments. One is from resemblance in physical characteristics, concerning which, however, the evidence is inconclusive. The other is from resemblance of the languages and is of greater force. The general resemblance between the Hamitic and Semitic groups of languages are the following: the pronouns are similar; the verbs have similar tenses and formation of stems; it is claimed by some that the Hamitic roots, like the Semitic, were originaliy triliteral; the ending for feminine gender is the same, *t;* several of the numerals are very similar; both groups form nouns by means of a prefixed *m;* both write without expressing the vowels; and 50 or more words of ancient Egyptian are said to be identical with Semitic words. The possibility of accounting for these resemblances by borrowing from the Semitic languages by the Hamitic does not seem, however, to be entirely excluded. Of course, not all of the resemblances are such as are most liable to be borrowed, but any of them might be. The possibility of such borrowing is increased, too, by other considerations. For the Egyptian resembles the Semitic languages more than any other Hamitic language. And it has been thought, on other grounds, that Egypt has been subject to Semitic influences in early times. Some have believed, for example, that certain features in early Egyptian civilization were taken from the Babylonians. Others have thought that Arab invaders came into Egypt in early times. Such a relationship as is claimed between the Semitic and Hamitic races can not be said, therefore, to be yet established. And even if there were such a relationship, no sufficient reason appears for thinking that the primitive race must have had its home in Africa rather than in Arabia.

The conclusion that the earliest known home of the Semites was in Arabia may be said, therefore, to be reasonably well established. The arguments which are thought to show a previous residence in Africa are inconclusive. That view can only be regarded, in the present state of knowledge, as a conjecture with very little evidence to support it.

Separation into Nations.— Concerning the precise, or even approximate, date of the separation of each nation from the parent stock nothing is known. The recorded history of every Semitic nation begins long after that time. Even the order of departure of the different nations is not certain. Here, however, the languages themselves come in to supplement our direct knowledge. On account of the resemblances of the languages to each other, the order of separation is often stated thus. All the other groups departed from the southern, that is, migrated from Arabia, and settled in Babylonia and its vicinity. After dwelling here together for a long time, the Arameans first separated, then the Canaanites, and finally the Assyrians. There was also emigration southward, giving the southern Arabs, a branch of whom ultimately migrated to Abyssinia. It is doubtful, however, whether this outline is correct in all details. It assumes that the Canaanites are more closely related to the Babylonians than are the Arameans, while in reference to some features of the languages the reverse is true. It also presents difficulties in accounting for the Arameans from the time of such separation until their appearance in history. For while some had settled in upper Mesopotamia at an early time, yet the Assyrian inscriptions indicate that fresh streams of migration were coming into upper Mesopotamia, and into Babylonia and Assyria, for a considerable period of time before and after 1000 B.C., apparently from Arabia. It seems probable then, that at the first general separation between north and south, the ancestors of the northern nations went not to Babylonia, but to northern Arabia. After a considerable sojourn there, the Babylonians continued their journey to Babylonia, and part or all of the Canaanites, after a time, went on to Canaan, while the Arameans remained in northern Arabia, from which region successive waves of migration swept over Mesopotamia, Syria and their vicinity. The nomadic habit of life of many of the Arameans, which seems to be indicated in the Assyrian accounts, also points to such a residence in Arabia as is here indicated. Contact after the original division doubtless had much influence on language. The Arameans were probably thus influenced by the Arabs and by the Babylonians. The Babylonians themselves were also influenced by the Arabs with whom they had commercial intercourse in early times. Further, the Canaanites were without doubt influenced by the early intercourse between Babylonia and the region of Palestine.

The Individual Nations.— The earliest Semitic nation of which we have any history was in Babylonian. Their own records, which begin perhaps about 3000 B.C., give the first information concerning them. The earliest inscriptions show them already in Babylonia, but there are indications, as usually understood, of early con-

flicts with the original Sumerian inhabitants in southern Babylonia. Ultimately, however, the Sumerians became subject to the Babylonians and were gradually incorporated by them. In course of time the people of Babylonia became a mixture of various elements, Semitic and non-Semitic. The non-Semitic Elamites and Kassites had dominion over the land at various times, and must have contributed materially to the population. In the course of their history also it is probable that many Arabs and Arameans were incorporated into the population. The Babylonians remained a distinct people until their conquest by the Persians under Cyrus in 538 B.C., after which time they never again became independent, and doubtless were mingled with the Persians and others with whom they associated. The Babylonians were never nomads in historical times, but dwelt largely in cities. In all early history and to about 2000 B.C., the government was one of cities, with no power actually supreme. The Babylonians were not unwarlike, but were especially devoted to religion, commerce, science and education. Assyria was doubtless settled by colonists from Babylonia somewhat before 2000 B.C., and was at first subject to Babylonia. From about 1500 B.C., however, the nation was independent, and for most of the period from 745–606 B.C. held Babylonia in subjection, as well as at times before 745. Their national history ended with the capture of Nineveh by the Medes in 606 B.C. The Assyrians were much more warlike than the Babylonians, and considerably given to commerce, but cared much less than the Babylonians for religion, science and education.

The Arameans were not one nation, but rather many tribes. They came in waves of migration from Arabia to the frontier of Babylonia, and to upper Mesopotamia and finally reached the country later called Syria. In the Old Testament, Arameans are alluded to in connection with Abraham and his descendants, especially Jacob. The earliest mention of the Arameans elsewhere is probably in the Tell el-Amarna letters in the early part of the 14th century B.C. The Assyrian kings also speak of them from time to time in their inscriptions, beginning in the 14th century. From all indications it would seem that their earliest settlement of importance was in the upper Mesopotamia, between the rivers Euphrates and Khabur. This settlement was reinforced by fresh arrivals from time to time. Just when they passed over the Euphrates and occupied Syria is uncertain, but the indications suggest that somewhat before 1000 B.C. they had obtained possession of most of the country, especially the northern and middle portions, defeating and driving northward the Hittities who had previously possessed the country. About the same time they began to come in large numbers into the territory of Assyria and Babylonia, especially along the Euphrates. In the times of Tiglathpileser III and later, 745 B.C. and afterward, they also had settlements along the lower Tigris. In the earliest notices of them they were largely nomadic, but they soon turned to settled habits of life. In their government there was little unity; each political division consisted of a strong city and the people inhabiting a greater or less amount of territory around the city. Several of these city states would unite for a campaign, but these leagues never lasted long. The Old Testament speaks of the Arameans in connection with several cities, namely, Damascus, Zobah, Maakah and Beth Rehob. Other prominent cities of the Arameans were Hamath in Syria and Haran in Mesopotamia. Upper Mesopotamia is spoken of in the Old Testament as a region by the names Aram Naharayim and Paddan Aram. The most powerful of the Arameans were included in the kingdom of Damascus, but their power was broken when Damascus was captured by Tiglathpileser IV about 732 B.C. After this time the population of Syria and upper Mesopotamia no doubt continued to be largely Aramean for centuries, although the people did not form a nation, and had little political power. Of the many who used the various Aramean languages and dialects after this time (see SEMITIC LANGUAGES), it is probable that a large part were Arameans. But naturally many others were mingled with them, so that in their latter history the Aramaic-speaking people represented a mixture. The language was also adopted by those who were not Arameans, as, for example, by the Jews. Some who have left inscriptions in the language were not Arameans, but Jews and Arabs. The Arameans were a people of considerable warlike ability, although with little taste for political organization, and were much given to commercial pursuits.

All the Canaanite Semitic nations aside from the Hebrews, namely, Canaan, Ammon, Edom, Moab and Phœnicia, were occupying their respective countries before the arrival of the Hebrews from Egypt, how long before is not known with certainty. The Phœnicians are mentioned in Egyptian records as early as the 16th century and are prominent in the Tell el-Amarna letters. The Phœnicians were distinguished beyond any other Semitic nation as a commercial people, especially on the sea, and were great colonizers. Their form of government was the city state, Tyre and Sidon being the two most prominent cities. Whether the Hebrews were actually Canaanites or were a branch of the Arameans is uncertain, the indications for the latter view coming entirely from the Old Testament. If this view be correct, the Hebrews spoke Aramaic on their arrival in Canaan, and learned the Canaanite language from the people there. The other view is, however, rather more probable, according to which the Hebrews were themselves a branch of the Canaanites, although traditionally associated with the Arameans in the experience of Abraham, the founder of the nation, and his immediate descendants. The earliest statements concerning Abraham in the Old Testament connect him with the city Ur in Babylonia. Both the Old and New Testaments originated among the Hebrews. The Hebrews were not particularly distinguished as warriors, and in ancient times had no inclination toward commercial pursuits.

If the earlier conclusions concerning Arabia as the distributing point of the Semites are true it is evident that after the departure of the nations hitherto mentioned the Arabs remained by themselves in central and northern Arabia at a period long before we have any record of them. There are no indications in the early history that the Arabs had a centralized government. Rather it would seem that, being nomadic, they were early separated into many different tribes, having no political unity. They are mentioned quite often by the Assyrian kings who fought against them, beginning with Shalmaneser III in 854 B.C. Their chief military activity came during and after the time of Mohammed.

Of the time of migration into southern Arabia there is no definite information. Southern Arabia is of a different character from the rest of the land, being fertile and adapted to agriculture. The immigrants here naturally abandoned the nomadic habit of life. The knowledge of these south Arabian kingdoms comes chiefly from their own inscriptions, whose date is by no means certain. It is now thought, however, by those who have given special attention to the matter that the earliest south Arabian kingdom was the Minæan, extending from about 1250–600 B.C., at the latter date being conquered by the Sabæans, while the Sabæan kingdom lasted from about 750–100 B.C. Both were evidently kingdoms of considerable power. Probably about 350 A.D. some Sabæans migrated to Abyssinia, and there founded the kingdom of Aksum, where the language called Ethiopic was spoken.

Characteristics of the Semitic Peoples.—It is evident that the Semites as a whole were decidedly religious. But it is now evident that there was no Semitic tendency to monotheism, as was formerly supposed. The three great monotheistic religions of the world, to be sure, Judaism, Christianity and Mohammedanism, have come from the Semites. But Mohammedanism was strongly influenced by Judaism, and Judaism and Christianity owe more of this teaching to the work of great individuals than to any natural tendency of the Hebrews. The Hebrews had, in fact, a tendency to polytheism, as is shown by their history in the Old Testament. The Arabs were polytheists before the time of Mohammed. All the other Semitic nations, so far as we know, were polytheistic.

In considering other characteristics and achievements of the Semites, especially in comparison with the Aryans, it needs to be remembered that the prominence of the Semitic nations precedes that of the Aryans. Hence the Aryans have been able to profit by whatever was good in the Semitic achievements. Considered in the light of their own times, the Semites were not deficient in those traits which have distinguished the Aryans. Usually, however, not more than two or three Semitic nations have manifested conspicuously any one of such traits. In warfare the Arabs, under Mohammed and his successors, the Assyrians and the Babylonians achieved signal success. The Assyrians, for their own time, were great organizers of conquered territory. The scientific attainments of the Babylonians were such that nearly all nations of antiquity learned many things from them, such as astronomy and mathematics. The Assyrians and Babylonians showed much artistic ability. Much of the literature of the Semitic nations is imaginative, especially the poetry and mythology.

See ARABIC LITERATURE; ASSYRIA; BABYLONIA; ETHIOPIA; HEBREWS; LANGUAGE; LITERATURE; PHŒNICIA; SYRIA.

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SEMLIN, Charles Augustus, Canadian statesman: b. Ontario, 1836. He went to British Columbia in 1862, spent some years in the Cariboo district and finally settled at Cache Creek. He was largely interested in agriculture and in the meat industry. He served many years in the assembly of British Columbia and was Premier in 1898–1900. He was afterward Commissioner of Lands and Works, Provincial Secretary and Minister of Education.

SEMMERING, zĕm'ĕr-ĭng, Austria, an Alpine pass on the borders of Styria and Lower Austria, 44 miles southwest by west of Vienna. The road over the Semmering Pass (2,940 feet) is of ancient date and here between 1848 and 1853 was built the famous Semmering Railway, the first of the European mountain railways. The railway begins at Gloggnitz and is carried along the face of precipices by means of 15 tunnels and 16 viaducts to Mürzzuschlag. The scenery along this portion of the line is of the grandest and most picturesque description. At its highest elevation, 2,891 feet, the line pierces the Semmering in a tunnel 4,667 feet long. Its entire length is 25 miles and it was constructed for the Austrian government at a cost of about $7,000,000.

SEMMES, sĕmz, **Raphael,** American naval officer: b. Charles County, Md., 27 Sept. 1809; d. Mobile, Ala., 30 Aug. 1877. He became a midshipman in the United States navy in 1826, a lieutenant in 1837, was volunteer aide to General Worth in the Mexican War and secretary to the lighthouse board in 1859–61. Upon the secession of Alabama he resigned his commission and was assigned to the command of the steamer *Sumter,* the first vessel of the Confederate navy. With this ship he cruised with success against Northern commerce in the West Indies. He then had the swift steamer *Alabama,* or No. 290, built in England, and in September 1862 started on his well-known voyage. He flew British colors when approaching his prey, hoisting the Confederate ensign when sure of his prize. His seamen were chiefly English. After a destructive career, during which he captured 64 vessels and burned all but seven, his ship was sunk off Cherbourg Harbor, France, by the Federal steamer *Kearsarge.* Subsequent to the war he practised law. His writings include 'Afloat and Ashore During

the Mexican War' (1851); 'The Cruise of the Alabama' (1864); 'Campaign of General Scott in the Valley of Mexico' (1852); 'Memoirs of Service Afloat During the War Between States' (1869).

SEMNOPITHECUS, a genus of Asiatic monkeys, the langurs, including species possessing an elongated tail, cheek pouches and ischial callosities. All of this genus are inhabitants of Asia and Asiatic islands. The sacred entellus monkey is a familiar example. See LANGUR.

SEMOLINA, hard grains of wheat left in the bolting cloth when the fine flour has been passed through its meshes and some times manufactured by millers. Certain hard, large-grained wheats growing in southern Europe produce the best semolina, which is used for thickening soups, for macaroni, for a French bread, as an addition to the Italian polenta and is employed in puddings, especially in England.

SEMPACH, zĕm'păH, Switzerland, in the canton of Luzerne, lies eight miles northwest of the town of Luzerne, on the lake of the same name. It is a walled town and its chief interest consists in its having been one of the outposts of the Swiss in their conflict with Austria. The battle of 9 July 1386, in which the Austrians under Duke Leopold received a crushing defeat at the hands of the confederated Swiss, was fought under its walls — a victory the more remarkable as won against extraordinary odds, and in which the famous Winkelried was the hero; the duke with 600 knights were left upon the battlefield. The anniversary of this victory is always celebrated on this spot by prayers and thanksgiving. Pop. 1,200.

SEMPER, zĕm'pĕr, **Gottfried,** German architect: b. Hamburg, 29 Nov. 1803; d. Rome, 15 May 1879. He attended the Johanneum of his native town and studied law in the University of Göttingen, but changed to the profession of art, having been attracted to the study of architecture under Gau. He then took a journey through Italy, Sicily and Greece. On his return he published 'Bemerkungen über bemalte Architektur und Plastik bei Alten' (1834), and the essays 'Die Anwendung der Farben in der Architektur und Plastik' and 'Dorisch-Griechische Kunst in 6 Tafeln mit Farben' (1836). He became the pupil of Schinkel in Berlin, who ungrudgingly recognized his talent and educated him to fill the place of professor of architecture in the Dresden School of Building. Between 1837–41 he built several important structures in Dresden, including the Court Theatre, and in 1849 traveled to Paris and London, in which latter city he undertook, among other things, the arrangement of the statuary in Kensington Museum. He was active up to the time of his death in Dresden, Vienna and other places, where his work is still a commanding feature of city architecture. He was an uncompromising adherent of the Renaissance style, as far as this was founded on the Roman of the later empire, especially as exhibited in the composition of the forums. His buildings are distinguished for harmony of composition together with purity and moderation of detail. Among his many works on architecture may be noted 'Uber Poly chromie und ihren Ursprung' (1851); 'Wissenschaft, Industrie, und Kunst' (1852), and 'Der Stil in den technischen und techtonischen Künsten' (1860–63). Consult Lipsius, 'Gottfried Semper in seiner Bedeutung als Architekt' (1880).

SEMPER, Karl, German naturalist: b. Altona, Germany, 6 July 1832; d. Würzburg, Bavaria, 29 May 1893. He was educated at Kiel, Hanover and Würzburg, traveled extensively in Europe and was engaged in a tour of the Philippines, China, Japan and the South Sea Islands in 1858–66. On his return he was appointed to the chair of zoology at Würzburg which he occupied until his death. He delivered a course of lectures before Lowell Institute of Boston in 1877, afterward published under the title 'Animal Life as Affected by the Natural Conditions of Existence' (1881). He edited nine volumes of 'Arbeiten aus dem Zoologischen Institut' in Würzburg, and also wrote 'Reisen im Archipel der Philippinen' (1867–72); 'Die Palau Inseln im stillen Ozean' (1873); 'Die natürlichen Existenzbedingung der Thiere' (1880), etc.

SEMPILL, Robert, Scottish ballad writer: b. about 1530; d. 1595. He was probably a cadet of the house of Sempill, of illegitimate birth; received an excellent education; spent part of his early life in Paris, and upon his return to Scotland went into military service. He ardently supported the Reformation in Scotland in his writings and severely attacked the Catholic cause. The majority of his poems have been preserved in the original, the most noteworthy of them being 'Ane Complaint upon Fortoun' (1581); 'The Legend of the Bischop of Saint Androi's Lyfe' (1584), and the 'Sege of the Castel of Edinburgh.' Two complete editions of his writings were published, 'The Sempill Ballates,' edited by T. G. Stevenson (Edinburgh 1872), and 'Satirical Poems of the Time of the Reformation' (edited for the Scottish Text Society by James Cranstoun, 2 vols., Edinburgh 1889–93). The last two poems were included in the 'Scottish Poems of the Sixteenth Century' (edited by Sir John Graham Dolyel, 2 vols., Edinburgh 1801).

SEMPLE, Ellen Churchill, American anthropogeographer: b. Louisville, Ky., 1863. She was graduated at Vassar College in 1882 and in 1891–92 and 1895 studied at the University of Leipzig. She has specialized in the study of the effect of geography on the development of races and on national life. She is a contributor to the *Bulletin* of the American Geographical Society, the New York *Journal of Geography* and to the London *Geographical Journal.* She was awarded the gold medal of the American Geographical Society in 1914. Author of 'American History and Its Geographic Conditions' (1903); 'Influence of Geographic Environment' (1911).

SEMPRINGHAM, Order of. See ORDERS, RELIGIOUS.

SEN, Keshub Chunder, an Indian religious reformer: b. village of Garifa (Gouripore), Bengal, 19 Nov. 1838; d. 8 Jan. 1884. His education was partly Hindu and partly English. He became attracted in 1858 to the Brahmo-Somaj, the Theistic Church of India, so much so that he soon began a campaign of religious reform for the regeneration of his fellow-countrymen. In 1865 a split in this Church occurred, resulting in the formation of one body under the leadership of Sen and assuming the name of "Brahmo-Somaj of India." After a visit to England in 1870 he put into effect, and with beneficent results, some philanthropic schemes based on the principles of those he had seen there. In 1878 dissensions arose among his followers owing to his frequent displays of ill temper and to his leaning toward mysticism, and the congregation split. The last few years of his life were full of controversy, disappointment and sorrow. He wrote 'Yoga, Objective and Subjective' (1884). Consult Müller, Max, 'Biographical Essays' (1884).

SENAC, Jean Baptiste, an eminent French physician: b. in the diocese of Lombec, Gascony, about 1693; d. 1770. He was graduated in physics at Rheims and later at Paris and in 1752 was appointed physician to Louis XV. He was a member of the Royal Academy of Sciences at Paris and of the Royal Society of Nancy. His greatest work and to which he owes his anatomical reputation was 'Traite de la Structure du Cœur, de son Action, et de ses Maladies' (2 vols., Paris 1749). He also published an edition of 'Heister's Anatomy' (Paris 1724); 'Discours sur la Méthode de Franco, et sur celle de M. Rau touchant l'Operation de la Taille' (1727); 'Traite des Causes, des Accidens, et de la Cure de la Peste' (1744), and 'Lettres sur la Choix des Saignées' (1730), written under the pseudonym of Julien Morison.

SÉNACOUR, Etienne Pivert de, French philosophic writer: b. Paris, November 1770; d. Saint Cloud, February 1846. He was of a melancholy and seclusive nature even as a boy, and read eagerly everything obtainable, especially such books as related to travel. For four years he studied philosophy at the Collége de la Marche and was then sent to the Seminary of Saint Sulpice by his father's orders, but escaped from there and went to Lake Geneva. In 1798 he returned to Paris and devoted himself to literature, though the main source of his meagre income was a pension obtained from Louis Philippe through the good offices of M. Villenain. His chief works are 'Rêveries sur la Nature primitive de l'homme' (Reveries of the Primitive Nature of Man) (1799); 'Obermann' (1804); 'Libres Méditations d'un Solitarie Inconnu' (Free Meditations of a Recluse) (1819). Of these 'Obermann,' a collection of letters from Switzerland treating on nature and the human soul, is by far the best known, and while a doubt bordering on atheism is expressed in its lines, yet the work is entirely original and contains many beautiful passages showing a delicate and charming feeling for nature.

SENATE, United States. The Constitution of the United States provides that "all legislative powers herein granted shall be vested in a Congress of the United States, which shall consist of a Senate and House of Representatives. The Senate of the United States shall be composed of two Senators from each State, chosen by the Legislature thereof, for six years, and each Senator shall have one vote." It was further provided that the senators chosen at the first election should be divided into three classes, the seats of senators of the first class to become vacant at the end of two years; of senators of the second class at the end of four years and senators of the third class at the end of six years, thus providing that one-third should be chosen every second year, and it is further provided that, "if vacancies happen by resignation, or otherwise, during the recess of the Legislature of any State, the executive thereof may make temporary appointments until the next meeting of the Legislature, which shall then fill such vacancies."

Regarding the qualifications of senators the Constitution provides that "no person shall be a Senator who shall not have attained to the age of thirty years, and been nine years a citizen of the United States, and who shall, when elected, be an inhabitant of that State for which he shall be chosen."

The Vice-President of the United States is president of the Senate, but has no vote unless the Senate is equally divided. The Senate is authorized to choose other officers, and also a president pro tempore, in the absence of the Vice-President, or when he shall exercise the office of President of the United States. The Senate has the sole power to try impeachments, and when sitting for that purpose its members must be under oath or affirmation. When the President of the United States is tried, the chief justice of the Supreme Court of the United States presides, and the concurrence of two-thirds of the members present is requisite to convict. Judgment in cases of impeachment cannot extend further than to removal from office and disqualification to hold and enjoy any office of trust or profit under the United States. The legislatures of the respective States are empowered to fix the time, place and manner of electing senators, but Congress may make or alter such regulations, except as to the places of choosing senators. The members of the Senate, like those of the House of Representatives, are in all cases, except treason, felony and breach of the peace, privileged from arrest during their attendance on the sessions of the Senate and in going to and returning from the same, and they are exempt from being held responsible elsewhere for anything said in debate in the Senate. No person holding any other office under the United States can be a senator, and no senator can be appointed to office, the emoluments of which have been increased during his term of service in the Senate. These restrictions apply also to members of the House of Representatives. The Senate may propose or concur in amendments to revenue bills, but cannot originate them, that power resting in the House.

The Senate received its existing form as a recognition of the equality of the several States and had not this concession to State's rights been granted by the convention which framed the Constitution the minor States would probably not have accepted that instrument.

The proceedings of the Senate were held in secret until the session of 1793, when discussions as to Albert Gallatin's right to a seat therein were held with open doors. This publicity had been urged from the beginning by those who argued that secret debates diminished the responsibility of the Senate and of its individual members to the people, and that publicity would inspire popular confidence in the Senate and its course. A resolution was passed that after the termination of the session then being held and as soon as suitable galleries

should be provided, the galleries, except on special occasions requiring secrecy, should remain open while the Senate was engaged in legislative business. Executive business is still disposed of in secret session.

The question of electing United States senators by direct vote of the people, instead of by the legislatures of the several States, has been agitated for many years. For this purpose an amendment to the National Constitution is necessary. In 1903 the legislatures of the several States passed resolutions asking Congress to call a convention for the purpose of considering an amendment to the Constitution providing for such election of United States senators. Resolutions to the same effect were presented in other legislatures, and finally in 1913 the matter culminated in the adoption of the Seventeenth Amendment to the Constitution which specifies "The Senate of the United States shall be composed of two Senators from each State, elected by the people thereof for six years; and each Senator shall have one vote. The electors in each State shall have the qualifications requisite for electors of the most numerous branch of the State Legislatures."

Next to President of the United States, and hardly excepting the Vice-Presidency, the office of senator is more sought than any other under the national or State governments. In the earlier period of the government, when the States still regarded themselves as almost independent sovereignties, the governorship of a State was looked up to as an office but little short of the Presidency. In the more recent years of the republic governors have often been eager aspirants for the senatorial office, and very willing to give up their places as chief magistrates of their respective States to sit in the so-called Upper House at Washington. Many of America's great statesmen have been members of the Senate, and no body of modern legislators has more august traditions or associations. Some of the States make it a rule to re-elect the same senators practically for life, and this is especially the case with the New England States and in certain Southern States. Senators are extremely jealous of their liberty of debate, and their prerogatives. The salary of senators is $7,500 per annum. The present full membership of the Senate is 96, but several seats are usually vacant through disputed elections or for other reasons.

SENATORIAL COURTESY, a custom in the United States Senate by which the procedure of that body is based on personal honor rather than on a code of rules. For instance, the Senate along this line of courtesy will not confirm a Presidential appointee in a State whose senators object to the person nominated.

SENATORIAL DISTRICT. See DISTRICT.

SENDAI, sĕn-dī', Japan, capital of the province Ken Mijagi, on the island Hondo, near the eastern coast, 190 miles northeast of Tokio. It is celebrated for its silk and lacquer manufactures, and carries on a considerable trade in fish and salt. It is on the railway running north from the capital.

SENEBIER, Jean, Swiss natural philosopher and historian: b. Geneva, 1742; d. 1809. After studying theology he was ordained a minister about 1762 and for several years preached at Chancy. Philosophy and natural history, however, held more charm for him than divinity and in 1773 he left the ministry to become keeper of the public library at Geneva. In 1787 he also became one of the conductors of the *Journal* of Geneva. His most important works are 'Essai sur l'Art d'observer et de faire des Experiences' (2 vols., 1775); 'Mémoires Physico Chimiques sur l'Influence de la Lumière Solaire sur les Trois Règnes de la Nature'; 'Rapports de l'Air avec les Etres organisés'; 'Histoire Littèraire de Genève' (3 vols., 1808); besides which he also published 'Catalogue des Manuscripts dans la Bibliothèque de la Ville de Genève.'

SENECA, Lucius Annæus, Roman philosopher, son of the rhetorician of the same name: b. Corduba (Cordova), Spain, about 4 B.C.; died in Rome by his own hand at the order of Nero, 65 A.D. As his family was wealthy and of equestrian rank, the boy was brought to Rome to be educated for the bar and an official career. He attended also with enthusiasm the lectures of several noted Pythagorean, Stoic and Cynic philosophers. He had gained great fame for eloquence and had entered the Senate through the quæstorship, when, in 41, at the instance of Messalina, who accused him of an intrigue with Julia Livilla, sister of the late Emperor Caligula, he was banished to Corsica. From there he sent to his mother, Helvia, the charming 'Consolatio,' but exhibited little fortitude in his exile. Finally, in 49, Agrippina, who, after the execution of Messalina, had married Claudius, and had prevailed upon him to make her son Nero the heir to the throne, secured Seneca's recall that he might act as tutor to the young prince, then 11 years of age. At Nero's accession in 54, he wrote the curious political satire (still extant) on the death of Claudius, commonly known as *Apocolocyntosis,* "Pumpkinification," a word formed upon the analogy of *apotheosis* "deification." During the first years of the new reign, Seneca, in conjunction with Burrus, prefect of the Prætorian guard, was, on the whole, successful in keeping Nero within the bounds of humanity. Agrippina, ambitious and cruel, was determined to rule the state through her son, and Seneca seems to have palliated the latter's excesses in order to destroy his mother's influence over him. Finally, when Poppæa Sabina, with whom Nero had become infatuated, induced him to order the assassination of his mother, Seneca wrote for the emperor a letter to the Senate, asserting that Agrippina had conspired against his life, and had committed suicide upon being discovered. The death of Burrus in 62 made Seneca's position quite insecure. Nero fell into the hands of men like the infamous Tigellinus; money was needed to meet his extravagant expenditures and Seneca had become enormously wealthy. Foreseeing his probable ruin, he offered to resign to Nero all that he had, and, upon receiving a declination, couched in terms of specious affection, retired into the country and lived with utmost simplicity. In 65 he was implicated in the conspiracy of Piso and was ordered to commit suicide. With his wife, Paulina, who insisted on dying with him (see the affecting account in Tacitus, 'Annals,' XV, 60–64), he opened the veins of his arms. Paulina's life was barely saved by her slaves; Seneca, after suffering prolonged agony, during which he displayed the utmost serenity, was finally suffocated in a vapor bath.

"Nothing in life became him like the leaving it." He was undoubtedly an earnest seeker after truth and right. The Roman world was much his debtor for the wise and humane administration of the state during the "golden *quinquennium*" of Nero; but he lacked real strength of character, and in his connection with Nero too often acquiesced in the doing of positive evil that a greater good might be accomplished. As a man of letters, he is incomparably the most brilliant figure of his time. He was an extremely prolific writer, his subjects are exceedingly varied, the ideas usually nobly conceived and eloquently expressed. In striking contrast to the periodic style of Cicero, he loves short, epigrammatic sentences. He is an expert in the use of every variety of rhetorical ornamentation, which, in harmony with the prevailing taste, he carries to excess. Though by no means a profound thinker, he is broad-minded and sympathetic in his presentation of the ethical principles, Stoic in the main, by which man's daily life should be guided. He was, indeed, by certain Fathers of the Church believed to have been a Christian, and there are still extant 14 letters, undoubtedly spurious, of a correspondence with Saint Paul. His moral essays embrace 12 so-called dialogues, 'On Peace of Mind,' 'On Anger,' 'On the Shortness of Life,' etc.; 3 books 'On Clemency,' addressed to Nero; 7 'On Benefits,' and 20 books of 'Letters to Lucilius.' With these may be grouped the seven books of 'Naturales Quæstiones,' which handle physics as a basis for ethical reflections. We possess also nine tragedies, composed rather to be read aloud than to be acted, and so rhetorical in substance that, though fine passages are not lacking, they are rather declamations than real poetry. They had, however, a great influence upon the drama of the 16th century.

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SENECA INDIANS, Mohegan "Sinnekens," "place of the stones," a tribe belonging to the Iroquois family. Their own name is *Tsonondowanenaka,* or *Tsonondowaka,* "people of the great hill or mountain," probably referring to the lofty eminence south of Canandaigua Lake. The term Seneca is a Mohawk rendering of this latter name, which has passed through Dutch to English hands. A member of the famous League of the Iroquois, founded about the year 1570. With the Mohawks and the Onondagas, the Senecas constituted the elder phratry of tribes in the social and political organization of the confederation, while the junior phratry was composed of the Oneidas and the Cayugas. The earliest known council fire of the Seneca people was established south of Lake Canandaigua, while their territory comprised the region environing Seneca and Canandaigua lakes and extended westward to Genesee River. As a member of the League, the Senecas were called *Honĕnninhohonte,* signifying, "They are fixed to a door or door-flap," denotive of the fact that the Seneca people were the political doorkeepers of the League, not because, as commonly asserted they stood at the western frontier of the territory of the confederation, but because being at first averse to joining the League, they were finally persuaded to do so by having the honor of the office of doorkeeper and of official executioner bestowed upon them. Their last two League chiefs or rulers were charged with the duty of ascertaining the good or evil designs of any alien who might seek to enter the jurisdiction of the confederation. In the American Revolution the Senecas espoused the cause of Great Britain against the colonies. Today the Senecas are represented by several different bodies of people dwelling in diverse places and under various forms of government. About 553 are on the Tonawanda reservation, 1,262 on the Cattaraugus reservation, 1,006 on the Allegany reservation, 10 on the Tuscarora reservation, and 6 on the Onondaga reservation, all in New York State; 87 are on the Cornplanter reservation in Pennsylvania, and 219 on the Grand River reservation in Ontario, Canada; total, 3,143. In addition there are 337 so-called "Senecas" in the Indian Territory, but these are not included with the foregoing, as it is doubtful whether they were ever true Senecas. The earliest estimate of the numbers of the Senecas, in 1660 and 1677, give them about 5,000. In 1825 those in New York were reported at 2,325. Morgan, 25 years later, estimated them at 2,712 with over 200 more on the Grand River reservation in Canada. About the same estimation was given in 1909. Skaniadariio, or Handsome Lake, the founder of the reformed pagan Iroquoian religion in vogue to-day among the various northern Iroquoian peoples, was a Seneca. On the migration, or probably expulsion, of the Awenrehronon from the headwaters of Genesee River, New York, in 1639, and on the later defeat of the Neutral Nation, about 1649–50, and of the Eries about 1654–57, the Senecas moved some of their settlements and colonies westward toward Lake Erie and along the Allegheny River. In 1657 there were 11 different alien tribes or peoples represented among the Senecas, thus indicating how well they exercised the right of adoption to replace their great losses in the almost interminable wars of the League, which had then lasted about 75 years. Of the several tribes formerly constituting the League of the Iroquois, the Senecas are the most progressive in the arts and knowledge of civilization. With incidental exceptions, the history of the Senecas previous to the American Revolution is virtually that of the League. See IROQUOIS.

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shall, O. H., 'The Niagara Frontier' (Buffalo 1885); Merrihew and Thompson, 'Seneca Indians in the State of New York' (Baltimore 1840); Phillips, J., 'Indians and Friends in Pennsylvania in 1791' (London 1792); Turner, O., 'History of the Pioneer Settlements, etc.' (Rochester 1852); Wooddy, W., 'Revolution in the Government of the Senecas in 1848' (Baltimore 1875).

SENECA LAKE, a lake west of the central part of New York State, about 25 miles south of Lake Ontario (q.v.), into which it discharges its waters by the Seneca and Oswego rivers. It is about 37 miles long, from north to south; and from one to four miles wide. Its depth is about 630 feet and it is 445 feet above sea-level. It is one of the group called the "Finger Lakes."

SENECA RIVER, a river of New York; flows east from the north end of Seneca Lake to the north end of Lake Cayuga, then turns north and is joined on the left by the outlet of Lake Canandaigua, then turns east, and receives in succession the drainage of the other parallel "finger lakes," Owasco, Skaneateles and Onondaga, then turns northwest, taking the name of Oswego River (q.v.) and enters Lake Ontario at Oswego. Length, including the Oswego, nearly 100 miles.

SENECA, or SENEGA, ROOT. See POLYGALA.

SENECA FALLS, N. Y., village in Seneca County, on the Seneca River and Barge Canal, near Cayuga Lake, and on the New York Central and Hudson River Railroad, about 160 miles west by north of Albany, and 37 miles west by south of Syracuse. Electric lines connect the village with Cayuga Lake Park, three miles distant, and with Waterloo and other villages. A fall of 50 feet in the river affords extensive water power for manufacturing, and explains the name of the place. Seneca Falls is in an agricultural and fruit-growing region. The chief industrial establishments are machine shops, woolen factories, fire-engine and pump works, grist mill and furniture factory. The shipments are chiefly farm products, fruit, dairy products, pumps and fire-engines. There are three banks; the national bank has a capital of $100,000. The educational institutions are a high school, the Mynderese Academy, public and parish elementary schools, private business schools and a public library. The government is vested in a village president and a board of trustees. Benevolent institutions include a hospital and the Johnson Home for Indigent Females. Seneca Falls was founded in 1791 and received its charter of incorporation in 1831. Pop. about 7,000.

SENECIO, sẹ-nē'sĭ-ō, one of the largest known genera of plants, comprising about 1,000 species; it belongs to the family *Asteraceæ,* and is universally distributed. It is, therefore, practically impossible to give a compact description of the generic characters; but it may be said that these plants are annual or perennial herbs, shrubs, or even arborescent, have basal or alternate leaves, and solitary, corymbose or paniculate heads of flowers, usually yellow in hue. These are made up of both radiate and tubular flowers, the latter being five-toothed and perfect, or of the tubular ones alone, on a flattened or slightly convex receptacle. The involucre surrounding each flower head is cylindric or campanulate, with its principal bracts in one series, distinct or slightly united at the base, and encircled very often with a ring of shorter scales. The achenes are mostly terete or compressed, sometimes curiously papillose. After wetting, these papilla put forth pairs of spiral hairs which secrete adhesive mucilage. The generic name has been derived from the Latin *senex,* an old man, in reference to the tuft of soft bristles surmounting the achene, and mostly white. These parachutes have so well distributed the seeds of the common groundsel (*S. vulgaris*), originally European, that it is found all about the civilized temperate zone as a troublesome weed. It is a more or less glabrate annual, about a foot high, with spatulate pinnatified leaves and rayless yellowish heads in corymbs. It blooms at all seasons, and is often sold in English cities as food for cagebirds. At one time it was even regarded as a love charm, and was said to have formed a part of the Virgin's bed. It was also of old repute for poulticing. *S. aureus* is a charming, slender, American species, with cordate basal leaves, called golden ragwort, and blooming in the spring. Squaw-weeds are other species of *Senecio.*

The plants known as *Cinerarias,* having dark-blue rays,—a rare color among composites,—are greatly cultivated and hybridized, but not many other senecios are valued in horticulture. Among these are the familiar German ivy (*S. mikanioides*), an easily propagated, rapidly growing, glabrous, twining vine, with small yellow flowers in axillary or terminal clusters, and glossy, deltoid-ovate leaves; and the Cape ivy (*S. macroglossus*), a beautiful greenhouse climber with golden flowers as large as marguerites and ivy-like leaves. One of the "dusty millers" is *S. cineraria,* a tall perennial, enveloped in white wool, and with small compact corymbs of rayless flowers. The handsome *S. pulcher,* with reddish-purple rayed flowers, of strong growth and cobwebby foliage; the great *S. japonicus,* over five feet high, and extremely ornamental, with its large palmate leaves, and large yellow flowers; and *S. petasites,* valuable for its large panicles of big, yellow fragrant flowers, blooming in midwinter, are also cultivated.

SENEFELDER, zā'nĕ-fĕl-dĕr, **Aloys,** Bohemian inventor of lithography: b. Prague, 6 Nov. 1771; d. Munich, Bavaria, 26 Feb. 1834. The son of an actor, in early life he tried unsuccessfully to be both actor and dramatist. Having learned something of printing he conceived the idea of inventing a process of his own, and was finally led by accident to his great discovery of lithography (q.v.). Subsequently he made important improvements, contrived a press, procured a patent and set up an establishment, which he carried on successfully. In 1809 he was appointed inspector of the royal lithographing establishment. He published the 'Elements of Lithography' (1819), a curiously illustrated work, which he translated into English and French. Consult Nagler, 'Aloys Senefelder und der Geistliche Rath Simon Schmidt' (1832); Pfeilschmidt, E., 'Aloys Senefelder' (Dresden 1877); Muller, J. W., 'Invention of Lithography' (New York 1911).

SENEFELDER, Leopold, Austrian physician: b. Vienna, 25 Sept. 1864. He was educated at the Preparatory Seminary of Mariaschein, the Mies Gymnasium, Bohemia, and the University of Vienna. In 1888–89 he served as interne at the Garnisons-Spitale No. 1, Vienna, was physician to the reserves and assistant physician at Rudolf Hospital, Vienna, in 1889–91. He established a practice at Sankt Pölten, Lower Austria, in 1892 and at Vienna from 1893 to 1905. After 1908 he was lecturer on the history of medicine at the University of Vienna. In 1902 Dr. Senefelder accompanied Cardinal Gruscha to the Jubilee Celebration at Rome. He is librarian and archivist of the Vienna College of Physicians and has published 'Anathema esto?' (1892); 'Die Katakomben bei St. Stephen' (1902); 'Die kaiserliche königliche Weiberstrafenstalt in Wiener-Neudorf' (1903); 'Dispensatorium pro pharmacopœis Viennensibus in Austria' (1907); 'Acta Facultatis medicæ universitatis Vindobonensis' (Vols., IV, V, VI, 1908–11). He collaborated in 'Geschichte der Stadt Wien' (1904) and contributed to various periodicals.

SENEGAL, sĕn-ē-gäl', West Africa, (1) a river which flows into the Atlantic near Saint Louis, the capital of the French colony of Senegal, in lat. 15° 48′ N. It is formed by the union of the Hafing and the Bakhoi, at Bafulabé, the former rising in the Futa-Jallon Mountains, southwest of Timbo, and the latter near Wosebugu. From the opposite or western side of the mountain in which the Bafing rises springs also the Falemé, another great branch of the Senegal, which runs north in a more direct course until it joins the united head streams above Bakel. The Senegal is about 1,000 miles long, and is navigable up to the cataracts of Félou in Kassan, about 700 miles from its mouth. A river service from Saint Louis to Kayes, 460 miles, is maintained during the flood season, and a railway line has been built from Kayes to Bafulabé (82 miles), and is being extended to Bamaku and Tulimandis on the Niger. The delta is marked by numerous *marigots* or channels which disperse its waters through the adjacent plains; and its mouth is dangerously barred, so as to be accessible only for small vessels in the dry season. Dredging operations are in progress to facilitate navigation. (2) A French colonial possession comprised in the government-general of French West Africa, named after the river and comprising the coastal strip from the British colony of Cambia north to Cape Blanco and extending inland to the French military territories of Niger and Mauretania. By a decree issued in 1899 the colony of Senegal was extended so as to include the western part of the former French Sudan territory. The area of Senegal is now about 74,012 square miles. The whole is under a lieutenant-governor, who has direct jurisdiction in the communes of Saint Louis, the capital, on the coast, Dakar, the chief port, near Cape Verde, Gorec and Rufisque. Several other districts are under administrators. The colony is represented in the French Chamber by one deputy. Dakar is fortified, and there is a military force of about 3,000 men, nearly one-half of them natives. The budget of the directly administered territory in 1916 amounted to $1,280,909, and the local budget, $413,916. All towns having a sufficiently numerous European or assimilated native population have urban schools, giving the same instruction as the French primary schools, modified to suit local requirements. At Dakar there is a superior technical school. At Saint Louis are a normal school for the training of native teachers, of interpreters, kaids (native judges) and chiefs' sons. There is a Mussulman superior school at Saint Louis with 20 pupils, and there is a large hospital for natives at Dakar. Millet, maize and rice are cultivated by the natives; the natural products include gums, castor-beans, earth-nuts, cocoanuts, rubber and kola. A salt industry is being developed. Cattle, sheep, goats and camels are domesticated, and some weaving, pottery-making and other industries are carried on. In 1913 the imports were valued at over $16,000,000, and the exports, consisting chiefly of earth-nuts, gums and rubber, at over $14,000,000, the trade being chiefly with France, although steamers ply also to Liverpool and Hamburg. In 1916 751 miles of railway line were open, the chief line being the coast line between Dakar, Rufisque and Saint Louis. In the same year there were also 1,494 miles of telegraph and 100 miles of telephone line in operation. A submarine cable connects Dakar with Brest. There is a river service on the Senegal from Saint Louis to Kayes (490 miles). Dakar has regular communication with French ports by the steamers of four French lines, and also with Liverpool and Hamburg. The French first settled Senegal in 1637. It was taken by the English in 1756, retaken by the French in 1779 and subsequently held by the English until the peace of 1814. The settlements did not flourish until the appointment of General Faidherbe as governor in 1854. He began a vigorous line of action, subdued the Berber chiefs who prevented the French advance inland and annexed their territories. This policy was pursued in the same spirit by subsequent governors; districts were annexed and protectorates proclaimed with extraordinary rapidity, though the two powerful chiefs Ahmadou and Samory occasioned a great deal of trouble, 1887–90. Pop. 1,282,566. Consult Lasnet et al., 'Une mission au Sénégal, ethnographique, botanique' (Paris 1900).

SENEGAL-NIGER, Upper, French colony forming part of the government-general of French West Africa. It is bounded on the north by the Algerian sphere; on the west by the Felémé River and the frontier of French Guinea; on the south by the frontiers of the Ivory Coast, Gold Coast, Togoland and Dahomey, and now includes Fada-N'Gourma and Say, and on the east by the military colony of the Niger. It, therefore, includes the valley of the Upper Senegal, more than two-thirds of the course of the Niger, the whole of the countries enclosed in the great Bend and a large part of the Sahara to the Algerian sphere of influence. The area is about 568,273 square miles with a population in 1914 of about 5,778,296 natives and 1,269 Europeans. The colony was formed in 1904 from the territories of Sene-

gambia and the Niger, less the Senegal Protectorate, which was restored to Senegal. At the same time the military territories were broken up and became a part of the colony. The first military territory was incorporated in Upper Senegal-Niger, and is administered by a colonel under the authority of the military governor; the second territory was handed over to the civil administration and the third is still an autonomous unit. Upper Senegal-Niger is entirely under civil administration, with the same judicial and educational systems as the other colonies comprised in the government-general. The budget of the colony for 1916 amounted to $1,788,641; the local budget for 1914 was $1,918,981. The most important and populous towns are Bobo-Dioulasso (8,736 inhabitants), Bamako, the capital (6,553), Sikesso (7,544), Segou (6,550), Kayes (5,900). All the principal towns have urban schools. There is a professional school at Kayes and a school for sons of chiefs. There is a Mussulman superior school at Timbuktu (5,100 inhabitants), which has 67 pupils. The natives cultivate ground nuts, maize, millet, cotton and rice; rubber and kariti are also produced. The principal native industries are pottery, jewelry, brick and leather-making and weaving. Cottons, foodstuffs and metal work form the chief items of import, while cattle, ground nuts, hides, wool and rubber are exported. In 1912 there were 4,050 miles of telegraph line and 74 miles of telephone line. The Senegal-Niger Railway extends from Kayes to Koulikoro, a distance of 349 miles. Small steamboats ply between Koulikoro and Timbuktu. In 1914 the imports into Upper Senegal were valued at $1,079,426, and the exports amounted only to $462,164. The Niger (territory) is farther inland than Upper Senegal, therefore, more remote from the seaports through which all West African trade must pass; in consequence the over-seas trade is inconsiderable. The value of the imports into the Niger in 1914 amounted to $193,117, the principal articles, in addition to government purchases, being cotton goods and tobacco; the exports reached $117,656 in the same year and consisted mainly of cattle, hides, ostrich feathers, native salt and tanned sheep and goat skins. Consult Lenfant, 'Le Niger' (Paris 1903); id., 'La grande route du Chad' (ib. 1904).

SENEGAMBIA, sĕn-ĕ-găm'bĭ-a, West Africa, so named from the Senegal and Gambia rivers (qq.v.), an extensive region comprising the countries between lat. 10° and 17° N.; long. 4° and 17° 30′ W.; bounded on the north by the Sahara, south by Guinea and west by the Atlantic. The area is estimated at from 400,000 to 700,000 square miles, and is almost wholly under French influence, with the exception of Bissagos Island and some coast territory at the mouth of the Rio Grande River, belonging to Portugal, and the British Gambia colony at the mouth of the Gambia. The name Senegambia is not used by the French, who call their colony and protectorate Senegal (q.v.). The western portion of the country is a low, flat and, to a great extent, swampy plain. East of this the country is mountainous, and the valleys run north and south. The principal rivers are the Senegal, the Gambia, the Jeba or Rio Grande and the Nuñez. In the level tract bordering the coast the rivers during floods overflow their banks, inundating the plains, and become connected with one another by means of canals. On the lower Senegal, so far as the inundation reaches, vegetation is very luxuriant. Rice, maize and other grains, with bananas, manioc and yams, are cultivated equally on the hills and plains. The orange, citron and other fruits introduced by the Portuguese are now extensively cultivated on the hills. Wild animals comprise the elephant, hippopotamus, monkey, antelope, gazelle, lion, panther, leopard, hyena, jackal, crocodile, etc. The climate is intensely hot and unhealthful for Europeans. The inhabitants are of many races, the principal being the Yolofs, Foolahs and Mandingoes. These negro tribes inhabit for the most part Middle Senegambia, between the Senegal and the Gambia. Upper Senegambia, to the north of the Senegal, is largely inhabited by Moors, who carry on an extensive trade in gum, etc., with the Europeans. The total population is estimated at 12,000,000.

SENEY, sē'nĭ, **George Ingraham,** American banker: b. Astoria, Long Island, N. Y., 12 May 1826; d. New York, 7 April 1893. He was educated at the Wesleyan University and at the University of the City of New York where he was graduated in 1847. He engaged in the banking business and in 1877–84 was president of the Metropolitan Bank, New York. He lost heavily at the time of the bank's failure in 1884, but later succeeded in partially re-establishing himself financially. Before 1884 his benefactions amounted to about $2,000,000. He gave $500,000 to establish the Seney Hospital in Brooklyn and $500,000 to both the Wesleyan University and the Methodist Orphan Asylum in Brooklyn. He also gave $250,000 to Emory College and the Wesleyan Female College, Macon, Ga., and liberal sums to other public institutions. He sold his famous collection of paintings at auction in 1885, receiving $406,910 for them. From a later collection he gave 20 valuable paintings to the Metropolitan Museum of Art, New York.

SENIJEXTEE. See Salishan Indians.

SENILE DISEASES. See Old Age and Its Diseases.

SENILITY. To obtain a clear conception of senility we must consider old age as consisting of two periods, the presenile and the senile. Physiologically these periods exist and are divided by a critical period called the senile climacteric which occurs about the 70th year. This period corresponds to puberty during the period of development and the menopause and the male climacteric during the period of maturity. The senile climacteric, like the male climacteric, usually causes so little distress that it passes unnoticed. Occasionally those around the aged person notice marked changes in mentality, more profound physical changes, greater debility, while some prominent manifestations of senility will appear less pronounced. In some cases the climacteric changes are very evident and the person passes rapidly from a condition of bright middle-aged mental and physical activity into a state of senile decrepitude.

During the senile climacteric the organs and tissues which have degenerated slowly now break down rapidly and the degenerative processes which have gone on rapidly before become less active. There is really a readjustment in the degenerative processes and this is followed by the progressive degeneration of all the organs and tissues and a diminution in their functions.

The *toute ensemble* of senility is characteristic. The stature is diminished through the greater curvature of the spinal column, flattening of the pelvis, depression of the heads of the femurs and, generally, broken-down arches. A further apparent diminution in stature is occasioned by the attitude of aged persons. The head sinks down and forward, the knees are bent to maintain equilibrium and there is a general slouching appearance which is partly relieved when a cane is used. The skin becomes pale and thin and, owing to the waste of subcutaneous fat and muscle, it becomes flabby, wrinkled and falls into folds. The teeth fall out, the alveolar process in which the teeth are imbedded wastes and there is a waste of the bone substance of the lower jaw. When the jaws are now closed the lower jaw is drawn further up to meet the upper jaw and the small, weazened face of the aged is produced. The eyes become dull and there is generally a gray ring called the *arcus senilis* around the iris. The nose and ears become thin and pale, the lips become flaccid and darker in hue, the color being a fair indication of the extent of the blood impairment. The hair rapidly whitens or falls out but there is often a growth of hair in unusual places as in the ears, nose, chin and on the upper lip of women, etc.

The face is expressionless and it is seldom roused to reflect interest or emotion.

The mental changes in senility are peculiar. In those who have had little intelligence or education there is a gradual diminution in all mental faculties. Memory fails until the event of a moment ago is forgotten, reason and judgment are lost, interest can be aroused with difficulty and only with greater difficulty can it be maintained; only the most powerful sensory impressions are received, interpreted and get responses. The emotions are dulled, there is neither fear nor hope, joy nor sorrow, and the individual will smile or weep without apparent cause. Usually he is apathetic, gradually lapsing into a state of complete amentia in which even the fundamental instinct of self-preservation is lost.

The intelligent, educated person generally retains reason and judgment but the mind is less active and brain fag develops rapidly. Memory is impaired, recollections of early events coming unbidden while later events cannot be recalled by any effort of the will. Old persons find it difficult to displace old ideas, habits and hobbies by new ones, and they are, therefore, called old-fashioned. Imagination sometimes develops delusions, such delusions always possessing the element of self-aggrandizement. It is difficult to arouse interest or maintain attention. Under some extraordinary stimulus mental acuity will be revived but this lasts only a short time and is followed by mental exhaustion. Weak sensations are not received owing to the impairment of the sensory organs but the mind correctly interprets sensations that it does receive. The emotions are dulled, there is seldom hope or joy, but usually there is a depressed, hopeless resignation to the inevitable. Sometimes religious teachings overcome the haunting fear of death, in some cases a materialistic philosophy makes the mind indifferent to death. Usually as the mind becomes weaker the fear of death and all other fears diminish; it is doubtful, however, if there is developed an instinct for death as Metchnikoff assumed.

Some individuals possess remarkable mental powers in old age. A critical study of the mentality of such individuals reveals in almost every case a concentration of mental faculties in one channel or direction while in every other direction there is profound mental impairment. The absent-mindedness and other peculiarities of these aged geniuses are really evidences of mental impairment. In the rare cases where the mental faculties retain their power with little or no impairment, the physical changes are slight and the whole process of senile involution is apparently retarded.

A remarkable phenomenon in senility is the approximation of the sexes toward a neuter type. The female chest gradually approaches the senile male chest in shape and the male pelvis becomes flattened until it resembles the female pelvis. In the male the hair on the face becomes thin while there is a growth of hair on the face of the female. His voice becomes higher, her voice becomes lower in pitch. The small weazened face and the dull expression give to both a similarity in features. It is a common observation that old couples resemble each other and through long association they exhibit similar mental traits. This phase of senility has not been sufficiently studied. While imagination undoubtedly plays a part in noting this resemblance it is in many cases sufficiently marked to attract attention. Virilescence usually begins soon after the menopause; its counterpart in the male is rarely observed before the period of senility. See Old Age.

I. L. Nascher, M.D.,
Author of 'Diseases of Old Age and Their Treatment.'

SENIOR, sē'nyôr, **Nassau William,** English political economist: b. Compton, 26 Sept. 1790; d. Kensington Gore, London, 4 June 1864. He was graduated from Eton and from Oxford, and in 1819 was called to the bar at Lincoln's Inn. He was the first professor of political economy at Oxford 1825–30; was appointed a master in chancery in 1836 and resumed his chair at Oxford in 1847. Of his writings, which comprise a number of excellent treatises on political economy, mention may be made of 'An Outline of the Science of Political Economy' (1836); 'Political Economy' (1850); 'Essays on Fiction' (1864); and 'Historical and Philosophical Essays' (2 vols., 1865).

SENLAC, sĕn'lăk, or **HASTINGS, Battle of,** the one battle in the Norman conquest of England. It was fought 14 Oct. 1066 at Senlac Hill, a few miles from Hastings, between William, Duke of Normandy, and Harold II (q.v.), king of England. Harold's fortified position was attacked at 9 A.M. by the Norman army in three divisions, strong in cavalry and archers, the centre led by William in person. The English made a stout resistance with their battle-

axes and other weapons, but part of them pursuing William's flying Bretons, the whole body was led into a trap by the feigned retreat of many of the Norman forces, the disordered ranks of the English being easily overborne by their enemies, who stormed and carried the hill. The death of Harold, who was pierced in the eye by an arrow about sunset, disheartened his men and they shortly dispersed. Battle Abbey was erected by William on the field where Harold fell and portions of it still exist. Among the literary treatments of the event are two poems of Chatterton and a drama by Cumberland. Consult Green, 'The Conquest of England' (1899); Freeman, 'Norman Conquest' (Vol. III, 1876). See WILLIAM I.

SENN, Nicholas, American surgeon: b. Buchs, Switzerland, 31 Oct. 1844; d. Chicago, Ill., 2 Jan. 1908. He was brought to this country when a boy and settled in Wisconsin. He was educated at the Chicago Medical College and the University of Munich, was house physician at the Cook County Hospital 1868–69 and practised medicine in Wisconsin 1869–93, being at one time surgeon-general of that State. After 1893 he practised in Chicago, where he was attending surgeon of the Presbyterian Hospital and surgeon-in-chief of the Saint Joseph's Hospital. He was appointed in 1898 chief surgeon of the Sixth army corps, ranking as lieutenant-colonel of volunteers and chief of staff in the field. From 1884–90 he was professor of surgery at the College of Physicians and Surgeons, Chicago, and after 1890 professor of practical and clinical surgery at the Rush Medical College. He was also professor of surgery at the Chicago Polyclinic and lecturer on military surgery at Chicago University. Among his works are 'Four Months Among the Surgeons of Europe'; 'Experimental Surgery' (1889); 'Surgical Bacteriology' (1889); 'Principles of Surgery'; 'Tuberculosis of Bones and Joints'; 'Medico-Surgical Aspects of the Spanish-American War'; and a 'Nurse's Guide for the Operating Room' (1903).

SENNA, Nelson Coelho de, Brazilian lawyer and author: b. Serro, Minas Geraes, 11 Oct. 1876. He was educated at the Normal School at Diamantina, Historical Institute at Rio de Janeiro, São Paulo, Nichtheroy and Ceará, and the Academy of Juridical Sciences, Ouro Preto. He has been successively secretary of the police and agriculture departments of his native state, professor of Brazilian and history at Mineiro Gymnasium, Bello Horizonte, and vice-president of the council of public instruction of Minas Geraes. He served in the first, second and third Latin-American scientific congresses. He is member of many learned societies both of South America and of Europe. His published works are 'Questões internacionães do Brazil'; 'A Edade da Pedra do Brazil'; 'Elogio literario de José Eloy Ottoni, poeta sacro brasiliero'; 'A Hulha Branca'; 'Los Indios del Brazil'; 'Contes Sertanejos'; 'Paginas de historia religiosa do Brazil'; 'Discursos Academicos'; 'A Bacia do Rio Dôce,' etc. He edited *Annuario Historico e Estatistico do Estado de Minas Geraes* after 1906.

SENNA, a nauseous, bitter but valuable purgative drug, obtained from the leaves of several tropical species of the leguminous genus *Cassia* (q.v.). The officinal species are shrubby plants, with nearly regular, five-parted flowers in racemes and alternate, pinnate leaves subdivided into many leaflets. Alexandrian senna is formed of the leaflets of *Cassia acutifolia,* which are dried by cutting the shrubs until the leaflets shrivel and tumble off. *C. angustifolia* grows in and about Arabia, where it was used in domestic practice by the Arabs, who were apparently the first to introduce the drug to Europe. It is called Indian senna, as it is cultivated in South India. Bombay senna is a very inferior quality of this variety, much mixed with stalks and dead leaves; the variety Tinnevelly, on the contrary, is the largest and cleanest senna in commerce. *C. obovata,* formerly of good repute, producing senna-pods and cultivated in India, is now classed among the inferior qualities and rarely met with except as an adulterant. Still other sennas are known under the name of the port of export, or place of growth. American or wild senna is the *Cassia marylandica,* a perennial abundant in the southern United States, sometimes eight feet high, with obtuse, oblong leaflets, numerous yellow flowers, with clawed petals and long linear pods. It has the qualities of Oriental senna in a lesser degree and was formerly used for the same purposes in popular medicine. Bladder senna is the *Colutea arborescens* and is also a purgative sometimes called bastard senna.

SENNAAR, sä-när', Anglo-Egyptian Sudan, a province extending between the Blue and the White Nile, from Khartum to Fazogl. It covers an area of 40,000 square miles. Generally speaking, it is a broad plain with occasional granite mountain heights and is at the north steppes thickly overgrown by wild grass and bushes; the southeast has tall forests intersected by fertile valleys. Gold and iron occur, and palms, tamarinds, etc., grow on the plain. Monkeys, lions, gazelles, giraffes, elephants, besides marsh and water-birds, are numerous; also domestic animals. The chief occupation is fishing. The products are rice, grain, melons, tobacco, sugar, senna, ebony and sandal-wood. The climate is exceedingly warm and during the rainy season is unhealthful. The inhabitants are negroes — the Funj, Nubian and Galla, and of mixed races, and are sometimes classified according to color. Slaves are imported. Sennaar (pop. 18,000), the former capital, stands on the Bahrel-Azrik or Blue Nile. The other towns are Fazogl (or Famaka), Roséres, Wod-Medineh and Khartum. Near the latter town are the extensive ruins of Soda, the ancient capital of the Funj, a negro race, who migrated there from Central Africa in 1500 and founded the Senaar kingdom, which lasted until 1821.

SENNACHERIB, sĕ-năk'ĕ-rĭb, an Assyrian king, son of Sargon, succeeded his father on the throne 705 B.C. Among his first acts as king was the suppression of the revolt of Babylonia and after accomplishing this he directed his arms against the Aramean tribes on the Tigris and Euphrates, of whom he took 200,000 captive. He then reduced a portion of Media, till then independent; placed under tribute Tyre, Aradus and other Phœnician cities; advanced against Philistia, made war upon Egypt and finally marched against Hezekiah, king of Judah, who had revolted. Hezekiah, terrified, yielded in a panic, and paid the tribute exacted, namely, 300 talents of silver and 30 talents of gold. On his return to Assyria Sennacherib made another attack on Babylonia and afterward reinvaded Judah. Having marched through Palestine he laid siege to Libnah and Lachish and finding that his messengers Tartan, Rabsaris and Rabshakeh had failed in obtaining the submission of Hezekiah, he wrote an intimidating letter to Hezekiah; but before he could bring his forces against the city, according to the Bible record, a visitation from the Lord during the night caused the death of 185,000 of his troops. In consequence of this calamity Sennacherib returned to Nineveh and troubled Judah no more. From Herodotus we learn of the Egyptian tradition regarding the destruction of Sennacherib's host, which is, that a multitude of field mice devoured all the quivers and bowstrings of the enemy and gnawed the thongs by which they bound on their shields. No mention of the destruction of his host is found in the monuments of Sennacherib. This ruler was one of the greatest of the Assyrian kings and was not only a great warrior but also a great builder. His largest architectural work was the palace of Koyunjik, which covered an area of fully eight acres. Of the death of Sennacherib all that is known is contained in the brief Scripture statement of 2 Kings xix, 37 and Isa. xxxvii, 38, from which it appears he was murdered by his own sons. See ASSYRIA; ASSYRIOLOGY; BABYLONIA.

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SEÑORA AMA, drama in three acts by Jacinto Benavente, was acted at Madrid 22 Feb. 1908. The story is one of peasant life on the plains of High Castile, a presentation of contemporary rural Spain as brilliant in color, but sordid and dead within, palsied with the degeneracy of a decaying civilization, from which all impetus and inspiration have disappeared, and merely husks of Church and State remain. Few dramas are of equal pessimistic power. As a veracious psychologic study, the play is of great value, depicting the sterility of the retarded country-side which is sunk in jealousies, sensuality and greed, where only the maternal instinct breathes unstunted amid the insentient fields. The minutest details are of unimpeachable realistic veracity. The author avoids any semblance of generalization. Yet in the absence of physical descriptions, the aspect of the Castilian plain and sierra is projected from the austere mentality of the peasantry with a rudeness of coloring and distinctness of outline which the Spanish painters have not surpassed. The sense of the motionless background provided by centuries of Spanish civilization is conveyed with the same economy of means. Upon the technical side the play is one for the artist. In illuminative insight and potency of imaginative suggestion, although a work of pure realism, it rivals in completeness the universality of idealistic art. There is the customary lack of *coups de théâtre,* reinforced by a contemptuous disregard of the conventional conceptions of the stage. The first edition appeared at Madrid, 1908. Consult also Benavente, 'Teatro' (Vol. XVII, Madrid 1909). The English translation is included in the third series of the 'Plays by Jacinto Benavente' (New York 1917 et seq.).

JOHN GARRETT UNDERHILL.

SENS, France, archiepiscopal city and capital of an arrondissement in the department of Yonne, situated on the right bank of the Yonne River, 70 miles southeast of Paris. The city contains the cathedral of Saint Etienne dating from the 12th century and a fine city hall, which contains also a museum of precious stones, a library and an art gallery. Manufactures consist chiefly of fertilizers, farm implements, leather, glue, serge, etc., and there is considerable trade in wine, corn, hemp and flax. Sens was known in ancient times as Agenticum and later as Senones and was one of the largest cities of Gaul, vestiges of the old Roman walls still being visible. Pop. about 15,000.

SENSATION. This term is used broadly to designate any form of consciousness which originates immediately from the stimulation of the sensory end-organs of the nervous system (e.g., the eye or ear). This usage fails, however, to distinguish between sensation and sense perception. In the narrower psychological meaning sensation applies to the elementary forms of consciousness originating under the conditions mentioned. Sensations are in this technical sense cognizant of simple sensuous data, such as colors, tones, etc., whereas perceptions are cognizant of objects. For example, we perceive a sunset, a complex visual object displaying various color qualities, e.g., whiteness, redness, etc., of which we become conscious as sensations. These sensations are regarded as simple and incapable of further analysis. We perceive a musical sound when a note is struck upon the piano. This sound is made up of a simple fundamental tone and its overtones. Our consciousness of one of these simple pure tones is a sensation. On these terms sensation is evidently largely an abstraction of the psychologist. Our actual sensory consciousness is commonly cognizant of objects, i.e., is perceptual.

Certain authors extend the meaning of sensation so as to include not only all elementary sense qualities arising directly from sensory stimuli, but also all such qualities when aroused in processes of imagination, as when, for instance, one closes the eyes and gets a visual image of a rose. They speak, therefore, of peripherally and centrally originated sensations. In so far as this usage calls attention to the fact that the sensory and ideational elements are qualitatively alike, whether called out by central or peripheral stimulation, it is justifiable. But well-established custom is violated by the procedure and it may be questioned whether it will endure.

The commonly recognized groups of sensations are as follows: color, including brightness, sound, taste, smell, pressure, heat, cold,

pain, articular, tendinous, muscular, thirst, hunger, sex, circulatory (including tickling, itching, etc.), respiratory and static (dizziness sensations from the semi-circular canals of the ear).

Psychologists are wont to treat sensation under four principal aspects, i.e., quality, duration, intensity and extensity. Of these four quality is generally considered most basal. A sensation of tone, for example, may vary in duration without appreciable alteration of the pitch, which constitutes its most essential quality. Again, a color sensation may under certain conditions vary in extent without noticeable variation of quality. But a sensation which had no duration or no intensity would obviously be no sensation at all, and in general, if any aspect which a given sensation can manifest be reduced to zero, the whole sensation vanishes. Certain psychologists maintain that every sensation possesses all these aspects, but probably the majority hold that auditory sensations at least, and perhaps a few others, like smell, are lacking in extensity. Certain interesting facts concerning the relations of sensation intensities to one another are formulated in Weber's and Fechner's laws. (See WEBER'S LAW). According to Weber equal differences in sensation intensity are produced by relatively equal differences in stimulus intensity. If we place a weight of 20 grams upon the hand, we shall notice no change until we have added another whole gram, i.e., of the original stimulus. If we take a weight of 100 grams, we must now add not one gram but $\frac{1}{20}$ of 100 grams or 5 grams, before we notice a change. The same sort of relation holds for a number of the senses within the medium ranges of intensity.

Sensations depend upon the stimulation of specific end-organs connected with specific brain centres. No one ever gets visual experiences who does not possess an optical centre in the cerebral cortex and who has not at some time possessed a functioning retina. No one ever gets auditory experience without a similar use of the ear and the auditory cortex and the same sort of thing is true for each of the sensations.

The stimuli which produce sensation are classified as adequate and inadequate, internal and external, mechanical and chemical. The only pair which requires any explanation is the first. Each sense organ is fitted to respond primarily to some special form of physical stimulus, e.g., the eye to light, the ear to sound, etc. Such stimuli are called adequate. In addition to these adequate stimuli, however, the senses can be aroused by other forms of stimulation designated inadequate. Thus an electric current conducted to the frontal region of the head may produce sensations of light. Pressure on the eyeballs similarly occasions color sensations. It may be added that sensations often continue after the stimulus is removed. Such sensations are known as after-sensations. In the case of vision they present very remarkable characteristics and are commonly called after-images.

Sensations combined in various ways and reinstated in the form of memory and imagination furnish the basis of all our ideas. They are accordingly the foundations upon which rests the whole structure of knowledge. To understand their function in this particular it must be borne in mind that in actual experience they are not mere naked qualities, but that they serve to convey meanings and that it is in this manner that they achieve fundamental import for mental life.

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SENSATION, Organic. The term organic sensation is nowadays applied broadly to all those sensations which originate from internal bodily stimulations. They are called forth by mechanical, chemical and thermal changes in the organism. Among the sensations which are commonly held to belong to this group may be mentioned pain, pressure and temperature from the interior of the organism; sensations from the muscles, tendons and joints; sensations from the alimentary canal; sensations from the circulatory, respiratory and sexual organs; and finally sensations which are supposed to originate from the semi-circular canals of the internal ear. These sensations are sometimes distinguished from the other forms of sensation like vision and hearing on the ground that they convey to us primarily a knowledge of the state of our own organism rather than knowledge about the external world. This distinction is, however, only roughly accurate.

The sensation qualities which originate from these senses can be described only with approximate accuracy, for psychological analysis has not succeeded as yet in unraveling all their complexities. Pain, pressure and temperature are familiar experiences requiring no description. From the muscles we obtain sensations which suggest dull pressure, becoming under conditions of fatigue somewhat unpleasant and in condition of cramp leading to distinct pain. From the tendons we obtain sensations which inform us of the movement of our limbs and particularly sensations of strain and resistance. It is generally held that from the joints we receive important sensations which also inform us of the movements of our limbs and in particular make us aware of their position. Certain authorities have called in question — both on anatomical and psychological grounds — the significance of the articular sensations. These sensations from muscles, tendons and joints commonly occur together and are sometimes spoken of in a group as the "muscle sense" or the kinæsthetic senses. Experimental devices are necessary in order to isolate them from one another. The circulatory processes are probably responsible for such subjective sensations as feverishness, shivering, "pins and needles," itching, tingling and tickling. Of course certain of these sensations are at times called forth by direct external causes. The heart itself occasionally gives rise to very distinct sensations, commonly of a painful character. The respiratory organs are probably responsible for our feelings of suffocation, of "stuffiness" and closeness as well as for those of freshness and stimulation in the air. The alimentary canal occasions at least three specific qualities: hunger, thirst and nausea. Undoubtedly the processes of secretion and excretion affect the general tone of consciousness from time to time, although, with the exception of the sexual organs, it is difficult to say whether they produce any real sensations apart from those already mentioned. The respiratory, circulatory, alimentary and sexual sensations are sometimes spoken of as the "vital sensations."

The semi-circular canals together with the vestibular portion of the internal ear are commonly regarded as responsible for our impressions of the movement of the body as a whole; but it seems certain that under ordinary conditions other senses contribute to these impressions and only in the case of dizziness is it at all clear that the sensations themselves are different from those hitherto mentioned. It is in any case reasonably certain that these organs constitute part of a reflex system by means of which the body equilibrium is maintained.

The term common sensation, or sometimes common feeling, has been applied more or less indefinitely to this whole organic group of sensations with special reference to the fact that our general feelings of vigor, health, discomfort, depression and so on depend upon them. When these terms are used at present they are more commonly applied to sensations like pressure and pain, which are conceived as widely distributed over the body and therefore as more or less common to the impressions gained from various sense organs.

Organic sensations are undoubtedly dependent like other sensations on the stimulations of sensory end-organs connected with centripetal neural pathways leading to the brain. These end-organs instead of being placed upon the surface of the body, like those of the more familiar senses, are imbedded in the various deep-lying tissues of the organism. A marked peculiarity of many of these sensations is their tendency to set up massive, widespread irradiating effects often quite remote from the seat of stimulation. This is probably brought about by means of the intimate connections of many of these organic sensory nerves with the sympathetic nervous system. This is less true of the kinæsthetic sensations and certain forms of presure than of the remaining members of the group. Pain affords many striking instances.

The organic sensations play an extremely important part in the phenomena of feeling and emotion. In such emotions, for example, as fear and anger it is clear that a large part of the content of our feeling is made up by sensations of this character, e.g., sensations of tingling or flushing which come from circulatory changes in the skin, painful sensations from the region of the heart, sensations of choking which come from the respiratory passages, sensations of trembling which come from the motor mechanisms, and so on. The James-Lange theory of emotion makes the reflex stimulation of these organic sensations the cardinal fact in emotion whereby it is distinguished from other forms of consciousness.

These sensations are also held to possess distinct significance for the processes of memory and recognition. It is thus maintained by certain authorities that the characteristic psychological process when we recognize a familiar object is found in the arousal of certain of these organic sensations which are called forth by familiar objects, whereas a different set of organic qualities is aroused by unfamiliar objects. It seems fairly certain in any event that the process of recognition is characterized by the presence of a definite mood and the specific qualities of our various moods are by general consent of psychologists determined by the presence of definite organic sensations.

Ribot and others urge furthermore the existence of "affective memory." By this they mean that in addition to our ability to recall ideas and in addition to our ability to remember whether any given past experience was agreeable or disagreeable, we possess the capacity actually to reinstate in some measure the original affective coloring of a past experience. This is brought about, they maintain, either by our capacity freshly to arouse the organic sensations which originally belonged to the experience, or by our ability to arouse the images or mental copies of these sensations. Certain psychologists deny the existence of these images. Without attempting a discussion of the merits of this doctrine it is safe to say that individuals vary vastly in the degree to which they actually possess this capacity of fresh arousal of either the organic images or sensations characterizing a former experience.

Aside from the particulars already mentioned organic sensations possess small value for the cognitive side of mental life. They bring us relatively little exact knowledge and in conditions of health come only infrequently to clear consciousness. On the other hand they are ordinarily marked with distinct feeling-tone, are definitely agreeable or disagreeable. Under conditions of health they seem to afford the basis of our feeling of well-being, a feeling which is sometimes vivid but usually dim and vague. They are very disagreeable and painful when the bodily processes are overtaxed or disturbed in any way and it is in connection with such experiences that we most often find them coming distinctly into the foreground of the mind. The discomfort of indigestion, extreme fatigue and headache will illustrate the point.

Although their value for our knowledge processes is small, their significance for the life of impulse and volition is tremendous. The two great impulses represented by hunger and sex may suffice to illustrate this side of the subject. All our processes of will and the whole substructure of character are honeycombed with influences which originate in these impulses, and the impulses themselves are but the motor expressions of stimulations from organic sensations.

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SENSATIONALISM, *in philosophy* the doctrine that our ideas originate solely in sensation and consist of sensations transformed Locke has been classed with Condillac and other philosophers of the 18th century as holding the doctrine of sensationalism; but Locke teaches that "all human thoughts, even the most complex and abstract, are due to experience": they are all made up of "simple

ideas,» and are due to phenomena of which we are percipient in the five senses, or else they are due to reflection on «the operations of the mind.» Condillac most distinctly refers all ideas to sensation. He supposes a statue organized within like a man, but as yet without sensibility. He endows this statue with one sense after another till it becomes perfectly a human being, and holds that it then would possess exactly the same ideas as ourselves, though in its first state it had no ideas.

SENSE-ORGANS. See ANATOMY, COMPARATIVE.

SENSES, in psycho-physics, anatomy, physiological-psychology and in philosophy, specialized nervous apparatus and the psychological process by the stimulation of which (or its equivalent) qualitatively distinct sensations are produced. Sense is equivalent to the Latin word «sensus,»* the Italian «senso,» the French «sens,» and the German «sinn.» A sensation — for to understand the import of «sense» it is necessary that one should understand «sensation» also — is that process of nervous or quasi-nervous irritation which can only be accounted for by the present operation of a stimulus or its equivalent upon a sentient being. It is the feeling that takes place while a sense-impression is made. A sense-impression is the effect of an event upon sentiency. What is that sense-perceived something, an event in which affects sentiency? It must be answered that it is designated by what is really one of the vaguest concepts in the whole realm of thought, an abstract notion, the idea of matter. For present purposes we shall define matter as anything which can affect the senses. Upon which motion we may build up one conception of «sentiency,» and define it as the «matter perceiving,» as an American philosopher, Dr. Paul Carus, defined it.

The use of «sense» as equivalent to «consciousness,» as in the phrases «time-sense,» «sense of responsibility,» and in 'sense of the heart' (the so-called *occult sense* of the mystic, Jonathan Edwards, who claimed by it one might know spiritual worth, truth, etc., by a kind of intuition), is confusing and inaccurate. (Consult Baldwin, 'Dictionary'). States of consciousness are nothing but the states of awareness or feelings connected with not only sensation, but also with perceptions, ideas and volitions. These states constitute the entire «subject.» Memory and imagination are at times defined as senses — internal senses; but this distinction is psychologically of no particular importance. Sensation (in German «Empfindung,» in French «sensation,» and in Italian «sensazione»), is a word confined by definition to those sense-impressions fully realized in consciousness, and this definition excludes the cerebral process of image-reproduction, etc., which is normally aroused in the absence of stimulation. It is at all times a very great advantage in thinking to recall that the terms «sense,» «sensation,» and even «matter» are, after all, at best concepts arrived at through a process of abstraction. For even so great a psycho-physicist as Ernst Mach (to cite one example) used «sensation» as synonymous with «reality» itself. Man generalizes, he marks and describes those features which a set of events has in common; but while generalizations are symbolized by mere words they deal with the events which are aglow with life or action. «Sense,» «sensation» and «matter» are such mental symbols, and they represent not the whole of reality, but at most only a single set of its features respectively.

Organism developed from protoplasm whose potentialities are four in number; and an organism whose histologic units are four would seem to have also four psychic facultative manifestations. Irritability, contractibility, metabolism and reproduction in the cell correspond to epithelium, muscle, connective tissue and nervous tissue in higher animal forms. In the mind they become sense, will, understanding and ideation. Epithelium has its analogon in «sense,» and ideation, its parallel in «tissue formation,» or «reproduction.»

Professor Ernst Haeckel in one truly profound lecture, beautifully explains how each animal cell, and even each plant cell, is endowed with a peculiar kind of «soul-life» of its own. In higher animal forms, he tells us, there are formed through division of work special «soul-cells» of «nervous-substance.» The lower we descend in the animal series the more the nervous system is simplified, and more, too, the nervous elements separate from each other, until finally they disappear merged in the mass of an undifferentiated organism. It is the same with all the other apparatus, with all the anatomical elements; and it would be as absurd to refuse sentiency to an animal because it has no brain, as to declare it incapable of nourishing itself because it has no stomach. Sentiency itself originates through contact and interaction of matter with matter. And the truth is that the nervous system arises like other systems from division of labor. Lower creatures are sentient, the higher brute animals conscious, but self-consciousness is found only in man who alone is aware that he knows.

To Demosthenes, the eloquent orator of classic antiquity, is ascribed the statement that all the senses are modifications of the sense of touch. Sentiency is always an awareness of objects in external material existence. So too is it with the senses. Kant distinguishes two sources of knowledge — sensation and pure reason. Sensations are incidental and particular; come to us singly in a haphazard way and without affording any information concerning a necessary connection. The character of pure reason alone is the intrinsic necessity and universality of its statements. The sequence in which the specialized apparatus of each sense appeared in the evolutionary process is unknown. Touch, taste, sight, hearing and smell are at times said to represent that sequence. The senses originated through irritation received at the periphery of

* One may recall that the Latin names of the five senses, with the word " sensus " itself, are all of the fourth declension in that tongue, and are thus nouns having one form only to express both numbers. Awkward as is any form of these Latin words in English, students have come to it, and speak of " sensuses," and even of " visuses," " sensus," " visus," " auditus," " gustus," "olfactus," and " tactus," whether employed as Latin or as English words, are, however, all nouns which reveal number only in the accidence of words with which they are grammatically connected. See the protest of H. H. Wilder, " Desmognathus Huscus [sic]", in *Science* (19 April 1918, New York); and the Reply of Professor Wilder by T. L. Casey in the same journal (21 June 1918).

an organism. Taste is most highly differentiated in man. Sight is perhaps keenest in birds and bees. Hearing is the strongest faculty of the hare. Smell is the peculiar faculty of the blood-hound and of the ant. Touch attains a high degree of perfection in the trunk of the elephant. The bee is sometimes said to possess a peculiar faculty, an «hygrometric sense,» as it is named. This quality or power of the bee is attributed to the little animal owing to an inference based on its undeniable power to «detect» and avoid a coming storm. It is just possible, however, that the bee employs sight rather than an hygrometric sense to detect the approach of storms, and to avoid them.

Through experience, a nerve, the optic nerve, became adapted to waves of ether. There irritations are transferred to the optic ganglions, and there possibly the disturbance is accompanied by the awareness called light. So also a nerve, the auditory nerve, became adapted to air waves. The irritations effected by these waves are transferred to the auditory ganglion, where possibly the disturbance is accompanied by the feeling known as sound. All other nervous cells of specialized sense, whether olfactory (or of smell), gustatory (of taste), or tactile (of touch), arose in evolution and function in a way similar to the senses of sight and hearing. Along the whole line of nervous fibres, from the point where sense-impressions enter to the place where muscular contraction such as usually follows the transmission of a shock from sensory to motor nerves, there is, physiologically, one uninterrupted chain of nerve motion. Yet the feeling or consciousness which accompanies a sensation is no motion.

One does not exhaust the number of sensations, however, if indeed one does the number of the specialized senses, in any mere enumeration of the sense-organs. These latter are the eyes, ears, nose, tongue and skin. In addition to the sensations of vision, hearing, smelling, tasting and touching (all of which Aristotle enumerated long ago), are to be mentioned, if only for greater completeness, pressure, temperature, pleasure, pain, muscular sensations, sensations in the ears, and sensation from the inner contents of the body. Pain and pleasure (see IRRADIATION), muscle sense, sensations from the semi-circular canals and vestibules of the ear, hunger, thirst, sexual-sense, fatigue, and sensations from the visceral organs — are internal, or organic sensations. Suffocation, internal warmth and chilliness are others of the same class. In all one perceives the characters of ordinary sensation, the sense-process or psychic function involved in the apprehension of anything by the senses.

As belonging to the outer world one speaks of sensations and their complexes arising in our own body as organic sensations, because we locate them in our own body. Examples are sensation of fatigue of our muscles, and the pressure and pain sensation of our inner organs. The relatively uniform elements of touch and organic sensations are distributed among sensations of pressure, warmth, cold and pain. In contradistinction to these, the special senses of hearing, seeing, smelling and tasting present an abundance of sensations, each of which according to its peculiar constitution is called a quality of sensation. Each such quality is variable in its intensity. Qualities of sensations all refer to the objective world. Our own body, to which touch and organic sensations relate, forms in contradistinction to our consciousness (the subjective reality, our real selves) a part of the outer world; — nearest to us indeed, but still a mere part of the objective or external world. Subjective existence is constituted of those feelings or states of consciousness whose activity is no motion. Objective existence is represented by things whose activities are motions. Man has abstracted from a group of sense-perceptions an idea of his «body.» The group of facts so collectively designated as «body,» the action of which appears in constant connection with and as a condition of our consciousness, is kept in health only through constant renewal of its waste products out of the resources of the objective world, of which it is a part.

Sensations, while they are psycho-physical processes normally due to actual stimulation, can occur without any stimulation being present. Delirium and the manifold examples of what are wrongly called sense-illusions are cases in point. Audition colarée, which seems to associate sound with color, is an example of excessive associative power, a result of insufficient balance of associative capacity, whereby the less near is approached because of the loss of what commonly should have been associated. When an adult professes to perceive a color, for example, every time he hears a letter of the alphabet named, it is hypothetically safe to say that were an investigation undertaken, it might disclose that the colors which such an adult professes to «hear» are the very colors in which the letters were printed on the blocks from which as a child such an adult learned his letters. There is no recorded instance worthy of credit of what has been styled «sense-transference,» either concerning people in the somnambulistic state (as has been claimed) or out of it. No person ever read, tasted, heard by the fingers, or the stomach or any parts of the body other than through those organs by which reading, tasting, hearing, as functions of the sense organs, are naturally performed. Those «higher» phenomena of clairvoyance prevision, retrovision, introvision and telepathy do not (in the ordinary sense of these words) exist at all. Mysticism of this sort colors the thought of only those people who in regard to some matters «spiritual» have strong convictions based on no evidence. The recollection of a sensation is nearly the same (but not the same) as an original sensation. For were it a sensation with a present stimulus then one might actually freeze to death through frigid imagination. Such recollection resembles the original sensation only (as being like it) a psychic event. By means of our senses we secure mental impressions through certain organs,— sensory or sense-organs,— concerning the world of objects, including impressions concerning changes in the condition of our bodies: and nothing more. There is a telepathy, or «far-feeling,» however, which does not stand in miraculous contradiction to the mechanical interconnection of cause and effect in the external world. In and through our eyes most distant stars are seen. Only in this sense has telepathy any claim to recognition by scientific psychology. Yet the feeling feature of sensations is

purely subjective. Things are mirrored in our eyes; sounds are heard with our ears; and abstract notions are formed mentally to represent them. It would of course be very absurd to expect that the things represented in a sensuous-manifold should migrate bodily into our heads; and yet it would be equally as absurd as some far feeling telepathists profess to believe, that things or objects in the external world could be felt without the normal use of the sensory organs.

Though no animal has specialized more senses than five, many are much more sparingly endowed. Of very great importance as regards our enjoyments and our sufferings all knowledge besides has its roots in sensation. «All our knowledge,» observed Gassendi long ago to Descartes, «appears plainly to derive its origin from the senses; and though you deny the maxim 'Quicquid est in intellectu processe debere in sensu,' yet this maxim appears nevertheless to be true; since our knowledge is all ultimately obtained by an influx or incussion from things external; which knowledge afterward undergoes various modifications by means of analogy, comparison, division, amplification, extenuation and other similar processes which it is unnecessary to enumerate.» (Gassendi, in 'Objectiones in Meditationem Secundam').

Hallucination is a misinterpretation of sensations. The feelings are real enough in such cases; but the representations concerning what are supposed to evoke these feelings are not valid. Sensations become precepts, many precepts of one kind become concepts. From these concepts by the help of the reason abstractions are drawn. Thus all the objects of our surroundings are mirrored in their relation toward us and among themselves in the living substance of the brain.

Bergson attributes to intutition a peculiar power. (Consult 'Creative Evolution,' English trans. 1913). That there is something unique and new at every moment may be granted. That it is also true that that this cannot be fully expressed by means of intellectual concepts may be also granted. Only direct knowledge can acquaint us with what is unique and new. But direct acquaintance of this kind is given fully in sensation and does not (as Bergson contends) require any special mystical faculty of intuition, for its apprehension. It is neither intellect nor intuition (in the Bergsonian sense), but sensation that supplies new data. Bergson makes much of evolution. It must be pointed out that it is only through the intellect that evolution can be known. If the intellect is misleading the whole of man's biological ancestry which we know through the intellect is presumably an erroneous inference. Bergson's advocacy of intuition as against intellect is thus a self-stultification.

Kant distinguishes two sources of knowledge — sensation and pure reason. Yet the ultimate data of experience and the bases of all knowledge are sensations. These data of experience are the several states of consciousness, the elements of which are the sensory impressions, which fully realized in consciousness are sensations. Experimenting with the purely formal is indeed a kind of experience, and may be distinguished as inner experience, just because it is not merely a subjective process, but ideal. Objectively and scientifically the external objects of one's sensations are those sensations measured in terms of what we suppose to be their causes. We no longer feel, owing to long practice of projection, our sensations as states of consciousness, but conceive of an independent reality as given immediately. But sensation is nevertheless only the psychical feature of the data of experience, and in the idea of a sensation, the material and physical stimulus is excluded. All one's sensations are in one's self, not in their cause. We are conscious primarily of our self-sensing and of our feelings; and not with the objective world. What man knows of his environment is all pure deduction from his own conscious states, particularly deductions from the feelings attending sensations. All these deductions serve no other purpose than that of the explanation of these sensations in terms of what we affirm to be their causes. Into that side of human consciousness in which reasoned reflection has no part, the vast contexture of material existence finds entrance in terms of sound, color, taste, cold, heat, resistance, weight, hardness, shape, situation and motion. Whatever one can know of one's environment results when recourse has been taken by one to causation, a concept yielded by pure reason, which causality having been projected into the external world, renders an explanation of sensations possible. Boyle long ago observed that whenever one speaks of experience correcting reason, one speaks improprly; for, he observes, it is reason itself that corrects reason with information supplied by experience. Here it should be noted that man knows many natural phenomena not directly observable through the senses; for example, the chemical constitution of the stars.

The psychological characters of sensation considered without reference to the conditions of its production are hearing, vision, smelling, tasting and touching. All these (we infer) are the effects of external causes or facts. They are so many subjective methods of representing certain processes of the objective world.

Even sensations are a kind of abstractions. By abstractions are meant a singling out, and isolating, a separation of sense impressions, so that they can be held for thought. Our eyes, for example, abstracts certain ether vibrations called light and transforms them into vision. The ears abstract only certain air vibrations and we transform them into sounds. The muscular sense abstracts resistance and we transform this into an idea of corporeality. The skin abstracts temperatures yielding elements for our notions of heat and cold. So is it with all other sensations. They abstract certain features of reality, or facts, and impress us.

There is a firmly rooted muscular sense of rest, uneasiness and of exertion. Various muscular efforts occurring in the head and face have become associated with definite emotions. The labial nasal, and ocular external coverings are muscles of expression. Certainly the vocal muscles give the same kind of an expression, not visible but audible. (Consult T. H. Evans, on 'Some Curious Psychosensory Relationships').

There are no such things as illusions of sense. What is illusory is only an inference to which the feeling elements give rise in sensation. The sensation and its feeling are real psychic events; and it is indeed only by some reality not merely sensible that even dreams can be condemned. What is illusory is manifest only in misinterpretation of certain experiences.

Vision, hearing, taste, smell and touch depend upon certain stimulations from without;— mechanical (touch), molecular (taste and smell), physical (sight and hearing), and muscular (muscular sensation). At times the required stimulation may be effected within the nervous system. The cerebral processes by which vision (for example) is produced may not only be started in the brain itself, but when so started may result in those identical interpretations which normally accompany the process when set at work by stimuli from the external world.

According to Roamnes there is a constant ratio between the amount of agitation produced in a sensory nerve and the intensity of the corresponding sensation. Weber states that if sensations are to increase in intensity by equal amounts the stimulus must increase by relatively equal amounts. His law is that the perceptible increment of sensation is proportional to the quantity of irritation. More precisely: In most cases the quantity of sensation is proportional to the logarithm of the quantity of irritation. Further researches in this direction were undertaken by Fechner, Volkman and Appel; and to their works the students of the subject may be recommended. It is entirely true that we do not experience sensation in the sense-organs. We feel the state of our nerves. The brain itself is the seat of all sensation.

Taste, smell, sight and hearing are operative because of special organs connected by special nerves with the brain. As to touch, while there are special organs, it is an unsettled question whether tactile sensations are conveyed by special nerves or by the ordinary sensory nerves of the skin. The organs of sense depend upon the alertness of the brain for efficiency. It is in fact the brain that sees, hears, etc. As sight, hearing and touch seem to be most concerned with the wants of the intellect, they are sometimes spoken of as the intellectual senses; while taste and smell, being intimately connected with nutrition, are known as the corporeal senses.

Cultivation of the senses, especially if begun in early life, will develop their usefulness. It produces the accurate hearing of the musician, the keen eyesight of the pilot, engineer and expert microscopist, and the accurate touch of the blind. But training may be carried to such an extent as to make these senses sources of misery. Certain persons are painfully conscious of the slightest discord; others almost instantaneously detect, with a feeling of disgust, the inharmonious blending of tints which, to the average person, are all in harmony; still others are made uncomfortable by an odor perceptible to no one but themselves. All the senses become accustomed to continued impressions, so that they no longer perceive their existence. This condition may prove a source of danger, for one may, for example, become habituated to harmful odors. Sense-education of the feeble-minded, as accomplished by Seguin and his wife, by «constant, assiduous, philosophical training,» is a noteworthy achievement. It seems to be a rule, with but few exceptions, that when one sense is lost or seriously impaired nature sharpens some other.

Touch, or tactile sensibility, enables us to appreciate by actual contact, the size, form and consistency of objects and the character of their surface. It is most sensitive in the margin of the lips, tip of the tongue, palms of the hands, and under surfaces of the fingers. Some writers speak of «general sensibility» as one of the senses, and include under this term, touch, muscular sense or the sense of pressure, sense of temperature, etc. The organs of touch are end-bulbs and tactile corpuscles. See Muscle-Sensation.

Taste enables us to discover and recognize flavors. This sense resides in the tongue, soft palate, uvula, pillars of the fauces, tonsils and the upper part of the pharynx. The organs of taste are taste-bulbs and various papillæ. The nerves of taste are the gustatory branch of the fifth pair of cranial nerves and the lingual branch of the glosso-pharyngeal nerve. Only those substances can be tasted which are dissolved, and at the same time the mucous membrane of the mouth must be moist.

It is said that the German physiologist Valentin could detect a 100,000th solution of quinine. What we know of the different tastes are complex experiences made up of odors, motor experiences, pressure and pain sensations, visual elements and a far more limited number of taste elements than we suppose. Their number seems to be four: sweet, salt, sour, bitter. Of the physical stimuli of taste sensations we know even less than of the indefinite localized physiological organs of taste. Chemically different substances may even arouse the same sensational response; for example, both sugar and acetate of lead yield a «sweet» taste. Only one statement may be hazarded; namely, that the taste stimulus is always in a liquid form. Taste sensations and their brain area (little known) all involve attention, discrimination, judgment, and so on. The tongue tastes. It also feels. Aerated water is «felt»; alum «draws» the tongue.

The most satisfactory classification of smells as we meet them in nature is that adopted from Linnæus by the Dutch physiologist, Zwaardemaker. It recognizes the following classes: (a) Etheral smells, including all fruit odors; (b) aromatic smells, like those of camphor, spices, lemon, rose; (c) fragrant smells, like those of flowers; (d) ambrosiac smells, like those of musk; (e) alliaceous smells, like those of garlic, assafœtida or fish; (f) empyreumatic smells, like those of tobacco and toast; (g) virulent smells, like that of opium; (h) nauseating smells, like that from decaying animal matter.

Many smells are of course like tastes obviously complex experiences containing elements of taste, touch and vision as well as sensations of smell. The «pungency» of such smells as that of ammonia is a «touch» quality. Smell stimulus is gaseous, not liquid, and the property of stimulating the end-organs of smell is a function of the physical molecule, not of the atom, since most of the chemical elements are odorless.

Smell is the sense by which odors are perceived. The olfactory nerve is, like the optic nerve, a prolongation of the cerebrum. The olfactory bulb is at the anterior extremity of the

olfactory nerve (more strictly the olfactory tract), of which it is an enlargement, and the development of the bulb bears direct relation to the acuteness of smell. In some animals, in which smell is very acute, the bulb is of such size that it is called the olfactory lobe. In man the impressions of this sense often need to be confirmed through other senses. Odors, to be recognized, must be presented in a gaseous or vaporous form. Dryness of the mucous membrane of the nose and excessive secretion blunt the sense of smell. Some persons are so susceptible to odors and emanations that the smell of certain substances, as of roses, new-mown hay, etc., or of certain powdered drugs, may excite in them an inflammation of the nasal passages. Hay fever (q.v.) is one form of such inflammation. There is an intimate relation between smell and taste. Delicate flavors are not appreciated when the nose is obstructed, as by catarrh, etc., or in cases of anosmia (q.v.), loss of the sense of smell. Smell influences the respiratory process, and the breathing of a fine odor increases the amplitude of the respiratory movements. The sense of smell may be highly developed, especially where there is deficiency in other senses. By it certain blind and deaf persons are able to recognize anyone with whom they have previously come in contact. This delicate sense is impaired by oversecretion of the nasal mucous membrane (catarrh), by its dryness or its frequent irritation, and may be destroyed by disease or injury.

Sight is the faculty whereby we receive impression of light, movement, form, size, shades of color, and the manifold beauties of nature and art. The organ of sight is the eye, the nerve of sight, the optic nerve. Necessary also to proper vision are the eyebrow, eyelid, eyelashes, lachrymal and Meibomian glands, tear-passages, and certain muscles. Clear vision depends on the focusing rays of light through clear media upon the retina, and the conveyance of impressions so brought to the cerebrum by means of the optic nerves. Defects in vision are color-blindness, myopia, presbyopia, hypermetropia, astigmatism, etc.

Hearing is a sense whose organ is divided into three parts, external, middle and internal. The latter is essential, the others are accessory. Hearing is effected by means of impressions made by the vibrations of elastic bodies (ordinarily the atmosphere). Impressions of sound-waves are conveyed through the complex apparatus of hearing to the auditory nerves, and through them to the brain. Any interference with the delicate mechanism of the auditory apparatus, as by inflammation or injuries, blunts the sense of hearing. See ANATOMY, COMPARATIVE; NOSE; NOSE AND THROAT; SALIVARY GLANDS.

SENSITIVE PLANT, or **HUMBLE PLANT,** an herb (*Mimosa pudica*) of the family *Mimosaceæ*, a native of tropical America. It is an erect spiny or hairy plant with long-petioled pinnate leaves and numerous purplish flowers in roundish heads, followed by spiny, jointed pods. It is naturalized in many warm countries, and is cultivated as a curiosity in greenhouses and as a summer annual in gardens. The seeds are sown in early spring in any good garden soil and given ordinary care. The plants are chiefly interesting because of the movements of the leaves when touched. If only lightly touched the leaflets close in pairs, but if more roughly the petioles become depressed. Young foliage responds more quickly, the movement usually occurring within one second after contact. In a few minutes the leaves gradually resume their former expanded position, the time required depending upon the age of the foliage, the warmth of the atmosphere, etc. At night the plants "go to sleep," that is, the leaves become depressed as after contact. Other species of *Mimosa*, especially *M. sensitiva*, a semi-climber, are also somewhat sensitive to touch.

SENSORY AREA, a portion of the brain in which the terminals of the sensory nerve-filaments finally end, constituting the cerebral centres of sensation. The location of the general sensory area is by no means definitely known. There are a number of sensory areas: thus the area for the sensations of sound is located in the superior temporal convolutions of the brain, and destruction of this area does not prevent the patient from hearing save when both auditory centres are destroyed, but does prevent him from the intellectual appreciation of what is heard. The sensory area for sight is located in the occipital region; for smell in the brain-base. The general feeling sense-area, however, the so-called sensory centre in the brain, is thought to lie below the motor area, somewhat overlapping it. It will probably be many years before the exact limits of the various areas in which the different sensory axones terminate are known. When that time does come, however, the student of the diseases of the mind will be in a much better position to understand the different variations in personality as shown in diseases of certain areas. Consult Flechsig, 'Gehirn und Seele'; Barker, 'The Nervous System.'

SENTENCE, a combination of words so arranged as to express a complete thought. A sentence is, therefore, the unit of thought expression and as such it determines the construction of words in accordance with their relationship to one another and to the sentence itself. Sentences have been classified in various ways. According to grammatical form, they are simple, compound and complex; agreeable to rhetorical construction they are classed as periodic, loose and balanced. A simple sentence contains but one subject and one predicate, and sometimes one or the other of these two essential parts may not be expressed; but in this case it is necessary that it should be understood. The suppression of the subject pronoun is very common in some languages, notably Spanish. A compound sentence contains two or more principal clauses; example, "The way was long; the wind was cold; the minstrel was infirm and old." A complex sentence must contain but one principal clause and one or more subordinate clauses: "The stag at eve had drunk his fill where danced the moon on Mona's Rill." A periodic sentence is so constructed as to hold the thought in suspense until its close: "Having come to the town early in the morning and having wandered about it all day, it was only in the evening that he went to pay the expected visit to his friend." A loose sentence, on the contrary, may be terminated in two or more places, each termination making complete sense: "In the evening he paid the expected visit to his friend (after having come to the place early in the morning) and wandered about it all day." A balanced sentence consists of two parts similar in so far as their form is concerned, but frequently expressing a contrast: "She was an ornament to the society in which she moved; he was a disgrace to the mother who bore him." Sentences are also classified, according to their use, into declarative, interrogative, imperative and exclamatory. Most sentences are declarative, because a declarative sentence asserts something as a fact. "This road is long," "This road is not long," "This road may be long." These are declarative sentences because each affirms something. One affirms something that is positive, another affirms something that is negative, while the third affirms a doubt or a possibility of doubt in the mind of the speaker. An interrogative sentence, as its name implies, asks a question; an imperative sentence gives a command; and an exclamatory sentence makes a statement under the influence of strong feeling (hence in the form of an exclamation).

Parts of a Sentence.—A sentence may contain subject, predicate, complement, object and various modifiers. In general, in English, the subject and object must be expressed in an imperative sentence, when the pronoun subject is generally suppressed. The complement is used to express the completion of a verbal idea which the verb does not, of itself, complete: "This boy is already a *Man*." The sentence may have the same kinds of modifiers as the individual words. A subject or object, being a noun or the equivalent thereof, takes adjective modifiers; a verb admits adverbial modifiers; while a noun phrase may serve as the subject or object of a sentence, and as such may take an adjective modifier. Appositional nouns or noun phrases may also be used to modify, through the fact of their apposition, other nouns or noun phrases. Sentences are also sometimes classified as balanced or non-balanced. A balanced sentence has the words and phrases of one part so arranged that they correspond in position and form to those of another part: "Wherever a few great minds have made a stand against violence and fraud, there has been her spirit in the midst of them, inspiring, encouraging, consoling; by the lonely lamp of Erasmus; in the restless bed of Pascal; on the tribune of Mirabeau." A sentence should have clearness, force and unity. Of these three qualities unity is absolutely necessary for a perfect sentence. In other words a sentence should be a unit in substance and expression. (See RHETORIC). Consult Bloomfield, L., 'Introduction to the Study of Language' (New York 1914); Bosanquet, 'Logic' (London 1911); Kimball, 'Structure of the English sentence' (New York 1904); Lockwood and Emerson, 'Composition and Rhetoric' (Boston 1903).

SENTENCE, *in law,* is a judgment pronounced by the court or judge on a criminal, being the final determination of the court through a judicial decision, publicly and officially declared in a criminal prosecution. It is not the discretionary act of the court, but the judgment of the law, which it is the ministerial duty of the court to pronounce.

SENTIMENTAL JOURNEY, A. 'A Sentimental Journey Through France and Italy,' by the Rev. Laurence Sterne (1713–68), was the result of a seven months' trip that the author took for his health in 1765–66. On his return he completed 'Tristram Shandy' and, though delayed by serious illness, had written two books of 'A Sentimental Journey' by December 1767. These were published on 29 Feb. 1768, and added greatly to the reputation acquired through the former novel. Sterne's death, on March 18, left the book unfinished. What we have is a small volume usually regarded as one of the most original and choice books in English literature, though not of the highest quality. In France its reputation has been even greater than in England.

The book is essentially a more detailed and expanded form of the idea of the seventh volume of 'Tristram Shandy,' written while Sterne was in France in 1762–63, with his wife and daughter. Some of the characters and episodes are the same, as that of the mad girl Maria, but the book is composed from a more definite and special point of view; it was "designed to aid us to love the world and our fellow creatures better than we do." Hence, instead of describing show places and scenery or talking of anything in the usual tourist fashion, Sterne deals largely with chance acquaintance and humble adventure — with postillions, innkeepers, grisettes, monks, a starling, statesmen, chambermaids, traveling companions, the old officer, the mad Maria, and with such simple episodes as giving alms, buying gloves, breaking a harness. The aim, however, in all cases is to show the various subtle states of feeling and the sentimental relationships in all such situations. Apparently very rambling and episodical, the essence of the book lies in the delicacy and good-natured feelings of pity, appreciation, sensibility, benignity, or what not, that these various encounters arouse. One or two situations seem to be somewhat strained and are even mawkish and dangerous, but the general tone is cordial, humorous and charitable. Among the best known and characteristic are those of the monk, of the starling, and of Maria, who utters the famous phrase, "God tempers the wind to the shorn lamb." The style, like that of 'Tristram Shandy,' is detached and parenthetical and highly wrought, in detail; in general, it is digressive and episodical. It has much of the humor but does not essay the peculiar wit of the earlier book. Consult the 'Life of Laurence Sterne' by Percy Fitzgerald, the biographical criticism by Paul Stapfer, and H. D. Traill in the English Men of Letters series.

WILLIAM T. BREWSTER.

SENTIMENTAL TOMMY, a novel by J. M. Barrie, published in 1896. It details the life and development of a young writer and is taken to contain considerable autobiographic material. Its sequel is 'Tommy and Grizel' (1900).

SEOUL, sē-ool', **SÖUL,** or locally **HAN-YANG,** Korea, the capital of the country, on the river Han, about 70 miles by water from its mouth in the Yellow Sea, and 25 miles by rail from Chemulpo, its seaport. The city

proper is a short distance from the river, in a basin partly surrounded by heights, and enclosed by a wall. The former royal palace is the chief edifice, and with its grounds occupies over 500 acres enclosed by a lofty wall. Seoul is the seat of various foreign embassies; a Roman Catholic cathedral and a Confucian temple are other noteworthy buildings. Silk, paper, tobacco, mats, fans and similar commodities are the principal products of native industry. There are schools for the teaching of Japanese, French, Chinese, Korean, Russian and English, and an American Mission School, which is subsidized. Two Korean and 23 Japanese newspapers are published in Seoul, which is connected with all the ports of Korea and with the outer world by telegraph. Under Japanese rule considerable advance has been made. Electric lighting and electric street railways have been introduced, and there is railway communication with Chemulpo, Wiju and Fusan. Pop. about 303,000 including over 50,000 Japanese.

SEPARATE ESTATE. See LAW OF HUSBAND AND WIFE.

SEPARATIST SOCIETY OF ZOAR. See ZOAR, SEPARATIST SOCIETY OF.

SEPARATION. See LAW OF HUSBAND AND WIFE.

SEPARATISTS, in Church history, (1) Those who in the reign of Queen Mary of England refused to conform to the public services of the Roman Catholic Church. Among them was Mr. Rose, who was apprehended with 30 of his congregation while celebrating the Lord's Supper in Bow-church Yard, London. Another well-known Separatist was Mr. Rough of Islington, who with several others was burned at the stake by order of Bishop Bonner. (2) In Ireland the Separatists were numerous, consisting chiefly of the Walkerites, founded by the Rev. John Walker, who seceded from the Established Church of Ireland and founded a small church in Dublin, with the doctrines of the Sandemanians as their creed. Other Irish Separatists were Rev. Mr. Kelly and his adherents who left the Established Church and formed an individual and independent Sandemanian communion. The Darbyites of Ireland were Separatistic Millenarians from whom sprang the Plymouth Brethren. (3) The German Separatists seceded from the Lutheran Church in the 18th century and founded a Pietist sect in Würtemberg. Persecution drove them to emigration and they settled under George Rapp (q.v.) in Pennsylvania, where they founded the Harmony Society, calling themselves Rappists. Those who remained in Germany established themselves at Kornthal, under the name of Kornthalites. All who in Germany refused to conform to the German Evangelical Union, founded by Frederick William III of Prussia, were also known as Separatists. (4) The name was taken by some of the early Puritans such as the Traskites (q.v.). They were subsequently represented by the Quakers. Among the most important sects which have assumed this name are the Separatists of Zoar, a village of Tuscarawas County, Ohio. Their constitution is strictly communistic; they refuse to serve as soldiers; consider celibacy a higher life than marriage; reject all religious ceremonies, while maintaining the cardinal doctrines of Christianity. Although their numbers are considerably under 1,000 they enjoy great prosperity; but, belonging as they do to the peasant class of Germany, are simple and uncultured. They have neither audible prayer, nor anything that corresponds with the office of a preacher or minister in their public services. Consult Gardner, 'Faiths of the World.'

SEPIA. See CUTTLEFISH.

SEPIOLITE, a compact, clay-like mineral of smooth feel, hardness 2 to 2.5, specific gravity 2. Owing to its porous nature it floats on water when dry. Color white or slightly tinted gray, yellow, red, or green. It is a hydrous silicate of magnesium, $H_4Mg_2Si_3O_{10}$. Extensive beds in Spain are utilized as a building stone. The mineral from Morocco is used in Algeria as a substitute for soap. It occurs as a secondary mineral derived from magnesite in the plains of Asia Minor, in alluvial deposits. The mineral from these deposits, popularly known as «Meerschaum» (q.v.), is used in the manufacture of tobacco pipes.

SEPOYS, sē'poiz, or sẹ-poiz', the name given in India to the forces composed of natives, disciplined after the European manner. The French were the first to see that the transportation of troops from Europe to their Indian colonies would be too expensive and that Europeans would perish in great numbers by the exposure at sea and in the climate of India. They therefore took Hindus into pay and the English adopted the same policy. In 1900 the total strength of the native army in India was 155,249, and that of the European was 73,638. Though not generally equal in courage and dexterity to European soldiers, the Sepoys are hardy and capable of enduring much, and very temperate in their food.

SEPT-FOIL, a typical figure in Roman Catholic Church worship composed of seven equal segments of a circle, used to denote the number of the sacraments, gifts of the Holy Ghost, etc.

SEPTEMBER, the ninth month of the modern year, but the seventh of the old Roman year, which began in March. It has always contained 30 days. See CALENDAR.

SEPTEMBRISTS, in French history, the name given to the agents in the massacre which took place in Paris on 2 and 3 Sept. 1792, during the French Revolution. The numbers that perished in this massacre have been variously given; but the term has become proverbial throughout Europe for all that is bloodthirsty and malignant in human nature.

SEPTENNATE ACT, The. In the German Parliamentary elections of 1887 the struggle centred around the septennate, or seven-year army period. On 14 January the emperor dissolved the Reichstag and ordered new elections to take place. The government had proposed the addition of 40,000 men to the standing army, and sanctioned the maintenance of the present military force for another septennate. No previous army grant had been for more than two years. Prince Bismarck favored the measure. The emperor said, "The septennate means peace. Reject it and there will be war." But the delegates voted the supplies for three years only, and the chancellor, by a decree from the throne, dissolved the house. The government secured a majority of about

40 votes in the general election, 1 Feb. 1887, and on 11 March the new Reichstag passed the septennate bill.

SEPTENNIAL ACT, 1716, superseded the Triennial Acts (q.v.) of 1640 and 1694. It extended the duration of a British Parliament to seven years. The Parliament Act of 1911 reduced the maximum duration to five years. This measure was suspended during the European War. See GREAT BRITAIN; PARLIAMENT.

SEPTICÆMIA. See BLOOD-POISONING; PYÆMIA.

SEPTUAGESIMA (sĕp"tū-ạ-jĕs'ĭ-mạ) **SUNDAY,** the third Sunday before Lent, so called from its being about 70 days before Easter (*septuagesimus,* 70th).

SEPTUAGINT, sĕp'tū-a-jĭnt, the oldest Greek version of the Old Testament. Although nothing is positively known of the origin of the Septuagint it is accepted as probable that we owe the work, also called the LXX, the Alexandrine Version, the Version of the Seventy, etc., to some Alexandrine Jews, who, having lost the knowledge of the Hebrew, caused this translation to be made by some of their learned countrymen, for the use of the synagogues, and called it the Septuagint from the great sanhedrin of 72 members. It dates from the 3d century B.C. At first only the Pentateuch was translated; and the version of the remaining books of the Old Testament was accomplished gradually, the whole being finally completed in the 2d century B.C. From the varieties of style shown in the version it is clear that there must have been several translators, though how many it is impossible to ascertain. The language of the LXX is the Hellenistic Greek of Alexandria, based upon the Attic dialect. The most skilfully executed portion of the Septuagint is the Pentateuch, next to that the book of Proverbs. The translation of the Psalms and Prophets is very indifferent. Of the Prophets the version of Jeremiah is the best, and that of Daniel the poorest. It is inferred regarding the Hebrew manuscript or manuscripts from which the version was made, that the letters were substantially the same as the present square characters, that there were no vowel points, no separation into words, no final letters, and that the words were frequently abbreviated. From the harmony found to subsist in a multitude of instances between the Septuagint and the Samaritan version, it has been surmised that the latter was the basis of the former; but the enmity existing between the Jews and Samaritans militates against this hypothesis. To explain the resemblance between the two versions Gesenius supposes them both to proceed from a common recension of the Hebrew Scriptures, and other hypotheses have been made. The Septuagint is the original of every ancient version of Scripture with the exception of the Syriac Peshito and the Samaritan. It was the sole standard of authority during the first four centuries, and has been the Bible of the Eastern Church from the first. Of 350 direct quotations in the New Testament from the Old Testament, scarcely 50 are found which differ materially from the Septuagint. It does not appear, however, to have obtained general authority so long as Hebrew was understood at Alexandria, nor can it be proved to have been commonly substituted by the Jews for the original in the synagogue service at an early period. It was, however, adopted by Philo and Josephus, and was universally received by the early Christians. In the transcription of the Septuagint, of which numerous copies were made, a great number of mistakes crept into the text. The task of rectifying it was undertaken by Origen, and the version as amended by him finds a place in his Greek Hexapla. The Septuagint is of undoubted value to the Bible critic, though the translation is not always literal, and misapprehensions of the meaning of the original are frequent. Glosses are very often inserted, and arbitrary paraphrases are numerous. The principal extant manuscripts known are the Codex Alexandrinus in the British Museum, the Codex Vaticanus in Rome, and the Codex Sinaïticus (imperfect) in Petrograd. The principal printed editions are the Complutensian (1517), the Roman or Sixtine (1587), the Oxford of 1707–20, the Oxford of 1798–1827 (Holmes-Parsons, five vols., folio), and the Cambridge edition by H. B. Swete (1887–94; 2d ed., 1895–99, three vols.). The Septuagint, which had been used by Jews and Christians long after Christ, was gradually superseded by other Greek versions, such as those of Aquila and Symmachus, representing more closely the Hebrew text as it latterly stood, but only small fragments of these now exist. There is a Concordance to the Septuagint by Hatch and Redpath. See BIBLE.

SEPULCHRAL ARCHITECTURE, a form of art whose purpose is to give beauty or magnificence to tombs or to buildings used only for purposes of sepulture. The term may be extended to represent even the ornamental treatment of headstones or slabs. No particular style of architecture belongs strictly to sepulchral structures; the fashion being largely derived from the styles of civic or religious buildings prevailing at the period. Some styles, it may be said, lend themselves more readily than others, at least for splendor of effect. Such for instance is the Gothic, in which style many beautiful specimens exist, particularly in the cathedrals and abbeys of England. In this style is the sepulchral church of Brou at Bourg-en-Bresse. A distinction is here to be noted between the practice of ancient and mediæval times. In the case of the former the tomb was a building, large or small, apart from structures devoted to the uses of religious worship. The pyramids of Egypt were the most imposing of all human structures; the mausoleum at Halicarnassus, one of the wonders of the ancient world. The buildings erected in memory of the Mohammedan rulers in northern India as well as the Taj Mahal are to be taken with the foregoing as not strictly tombs, but as belonging to the domain of sepulchral architecture. Of all the Aryan peoples the Romans were conspicuous for their imposing tombs, specimens of which exist in the remains of the tomb of Cæcilia Metella and the Mole of Hadrian, now called the castle of Saint Angelo at Rome. Belonging to the period of the Renaissance are the tombs of the Medici, erected by Michelangelo, though of these the sculptural features are more important than the architectural. One of the most perfect specimens of this period is the tomb of Loys de Brézé, erected by his wife Diane de Poitiers in the cathedral of Rouen, and at-

tributed to Jean Goujon and Jean Cousin. In America the most notable specimen is the tomb of General Grant, a structure resembling in general form the tomb of Cæcilia Metella. See MAUSOLEUM; MONUMENTS; SCULPTURE; TOMB; BURYING-PLACES.

SEQUESTRATION, *in law,* the act of taking possession of property by legal authority, as to satisfy creditors, for the use of the State, etc.; also, an equitable writ, directed to a sheriff or a number of commissioners ordering them to enter upon the estate of the defendant and to take the rents, issues and profits and to keep or pay out the same as the court shall direct. It is also used by chancery courts to force compliance with their decrees or orders.

SEQUIN, sē'kwĭn, or sĕk'ĭn, an Italian and Turkish gold coin. It was first struck at Venice about the end of the 13th century, and afterward in all the other Italian cities, and from the Levant was introduced into Turkey. The Tuscan sequin is worth $2.30, the Turkish from $1.10 to $1.75.

SEQUOIA, a genus of *Coniferæ,* included in the sub-family *Taxodioidæ,* of which the other genus is the *Taxodium* or deciduous cypress. The Sequoia genus (named in honor of the Cherokee chief Sequo-yah, who invented the alphabet of that tribe), was for a time known as *Taxodium* or *Wellingtonia;* it comprised two species, *S. sempervirens,* the redwood, and *S. gigantea,* the "big-tree," both natives of California. The genus was once widely distributed, as fossil remains testify, and the petrified forest in Arizona is stated to be composed of species of sequoia. The flowers of the sequoias are monœcious and are borne in scaly inflorescences as terminal or axillary shoots in such great profusion, that the pollen covers the ground beneath the trees during their winter blooming. The pistillate flowers mature into a fruit, or oval cone, having persistent woody scales, broadened at their outside ends into a rhomboidal flat top, very much wrinkled, and with a slightly prickle-tipped apex. Their scales are slightly separated to allow the many brown, compressed seeds to escape and then spin away on their lateral wings. The leaves are acute, compressed and keeled, decurrent on the stem, alternate and inserted in spirals, very scale-like on the branchlets, but on older branches linear and spreading.

The redwood, which was the first *Sequoia* discovered, is the more common species, and grows along the Pacific Coast just so far inland as the sea-fogs can go. It is a very straight, handsome tree, with columnar trunk, and spreading branches and branchlets, and reaches in some instances as great a height as the other and more famous species. See REDWOOD.

SEQUOIA GIGANTEA, the "big-tree of California," is more rare. It is found in 10 small groves, forming an uninterrupted "belt" extending for 200 miles on the western slope of the Sierra Nevada Mountains, and nowhere else in the world. It grows at elevations of 4,000 to 7,000 feet. This has suggested that possible lower growths were destroyed by glacial action. The Calaveras grove near the northern extremity of this series is the most picturesque and important group of big trees, and was first discovered by J. Bidwell in 1841. These famous trees are the most massive of any in the world, but are not the tallest, being surpassed by the *Eucalyptus* trees of Australia. They are practically exempt from disease, and, if they were not injured by fire and by man, would have apparently an almost endless life. Some of them are judged, by the number of annual rings, to have been thousands of years old. Fully grown trees average a height of 275 feet, and a diameter of 25 feet. One of the most gigantic, cut down, with great difficulty, in 1853, was 302 feet in height, 96 feet in circumference, and after the bark was removed (which was itself nearly 18 inches thick, the diameter of the solid wood in the stump was 25 feet, 6 feet from the ground. This stump was used as a dancing floor, holding 40 or more persons. Others have been estimated as between 350 and 400 feet high. A section of one of these great trees has been placed in the Museum of Natural History in New York, and another in South Kensington, England.

The younger sequoias are very graceful, and charming in their dark blue-green foliage, being often grown in English and European parks. They have a straight, tapering stem from which the branches spring to form a narrow spire-like pyramid. After a few hundred years they begin to lose their branches, and become dome-like. Ultimately they become our picturesque trees, with a great trunk enlarged at the base, and strongly buttressed, fluted with low broad ridges, and covered with cinnamon brown bark (purple-tinted in the shadow) which follows the contour of the lobed trunk, and is deeply, longitudinally furrowed, and separated into fibrous scales on the ridges. This tapering shaft is naked for 100 or more feet, when great branches, eccentric in development, join in constructing the narrow, but massive domes which stand out above the other tall trees of the Sierras, and break into delicate but dense spray of much divided pendulous branchlets, blue-green when young but developing a bronzy tint when mature.

The big trees, while standing, have served as shelter for men and cattle, and are a constant attraction for tourists, the largest being known by name. One, the Wawona, in the Mariposa grove, has a portal cut through its base, which allows the passage of vehicles. But there is constant danger of their extinction. Only one comparatively unimportant and uninteresting group, the Mariposa grove, is efficiently protected. The others are owned by private interests and often by lumbermen, who cut down the magnificent trees for the sake of their light soft wood, bright red in the heart, and durable when in contact with soil, and which is dynamited apart, with enormous waste, and made principally into fencing and shingling. The big-tree has not the tremendous reproductive powers of the redwoods, the seeds have very low vitality, and in some groves almost no seedlings are found; moreover, the flocks of sheep pastured on the mountains destroy the saplings, and the dreaded forest fires not only decimate the patriarchs but devour the young growth. Consult Jeffrey, 'Comparative Anatomy . . . of the Coniferales,' pt. 1, Vol. V, Memoir Boston Society of Natural History (1903). See REDWOOD.

SEQUOYAH, sę-kwŏ'yä, or **GEORGE GIST,** or **GUESS,** Cherokee Indian inventor: b. about 1770; d. near San Fernandino, Northern Mexico, 1842. He exercised his ingenuity in numerous ways,—as silversmith, blacksmith, artist. In 1821 he completed the Cherokee alphabet, for which he received in 1823 a silver medal from the Cherokee general council. This alphabet was perfectly adapted to the peculiarities of the Cherokee tongue, which it expressed as the English alphabet never could. He borrowed many symbols from an English speller. His alphabet was quickly adopted, was very successful, and was employed by the missionaries and, in part, in printing a newspaper, *The Phœnix.* The giant Sequoia tree was named in his honor. Consult Foster, 'Sequoyah, the American Cadmus and the Modern Moses' (Ithaca, N. Y., 1885); Mooney, J., 'Myths of the Cherokee' in *Annual Report,* Bureau of American Ethnology, Vol. XIX (Washington 1902).

SERAC, a term applied to the ridges or ice pinnacles between closely spaced glacial crevasses. See GLACIER.

SERAGLIO, sĕ-räl'yō, Constantinople, Turkey, the former imperial palace of the Osmanli sultans, occupying the extreme eastern part of the city proper, at the entrance of the Bosporus. It stands on the site of ancient Byzantium and is of great historic interest. The existing buildings date from the time of Mahmoud II, and chiefly occupy the summit of a hill, which is surrounded by fine gardens, the whole being enclosed by ruinous walls, partly of mediæval origin. The entrance is on the west, near the church of Saint Sophia, by the Imperial Gate (*Babi Humayum,* the "Sublime Porte"), which leads into a court lined by the mint, the old church of Saint Irene (now an armory, with many interesting objects), a museum of antiquities (also of some interest), etc. Another gate, the *Orta Kapousi,* leads from this court into an inner one, which is surrounded by arcades and the former kitchens of the sultan, his wives and officials. The main part of the seraglio is then reached through the *Babi Saadet* or Gate of Felicity, formerly guarded by eunuchs. Here is the Hall of the Divan, where ambassadors were formerly received, councils held, and justice administered; the treasury, with beautiful and valuable collections; and the harem, where the sultan's wives were housed. There are also kiosks and other buildings within the enclosure. From the time of Mahmoud II, this palace was not regularly occupied by the sultans, and it therefore lost much of its former magnificence and interest. The word seraglio in Western parlance has come to denote a harem or place for the seclusion of concubines.

SERAING, sė-răn, Belgium, a town in the province of Liège, three miles southwest of the city of that name, on the Meuse river. The castle, formerly the residence of the Prince Bishops of the Church, was converted into one of the largest iron manufactories on the Continent. These extensive works cover a tract of 270 acres, and employ 10,000 men. The annual output is worth about $9,000,000. All kinds of machinery are manufactured. Connected with the establishment are hospitals, orphan homes, savings banks, schools, etc. Other industries are the glass-works (very extensive) and coal-pits. Shipbuilding is also carried on. During the European War (1914–18), the industries suffered exploitation and devastation at the hands of the Germans, for which reparation was subsequently enforced. Pop. about 42,000.

SERAJEVO, să-rä'yĕ-vō. See BOSNA-SERAI.

SERAJGANJ, sĕ-räj-gŭnj', India. See SIRAJGANJ.

SERAMPORE, sĕr-ăm-pōr', or **SRIRAMPUR,** India, in Bengal, a town on the Hugli River, 12 miles north of Calcutta, and opposite Barrackpur. It has a school, church, college and library, connected with the Baptist Mission. The principal industry is the manufacture of paper and mats. The town under the name of Frederiksnager, belonged to Denmark until 1845, when it was purchased by the English East India Company. Early in the 19th century it was the scene of Baptist missionary activities, and contains the graves of Carey, Ward and others associated with the work. The town is attractive, and a summer resort for citizens of Calcutta. Pop. about 50,000.

SERAO, să-rä'ō, **Matilda,** Italian novelist: b. Patras, Greece, 1856, the daughter of an Italian political exile and a Greek mother. She became a schoolmistress at Naples, and her experiences struggling with poverty during this period are related in the introduction to 'Leggende Napolitaine' (1881). At the same time she assisted her father in editing his newspaper, and contributed short stories of Neapolitan life to *Il Piccolo* and other local publications. She first attracted attention by 'Novelle,' a short story, followed by her first popular novel 'Fantasia' (1883). From 1880 to 1886 she lived in Rome interested in literary work with D'Annunzio, Scarfoglio and others, and published 'Cuore Inferno' (1881); 'Fiordi Passione' (1883); 'Piccole Anime' (1883); 'La Virtù de Checchina' (1884); and 'La Conquista di Roma' (1885). She married Scarfoglio and with him founded the short-lived *Il Corriere di Roma;* later returning to Naples where she edited *Il Corriere de Napoli* and subsequently founded *Il Mattino* and *Il Giornio,* which attained large circulations. She actively continued her book production. 'Ventre di Napoli' appeared (1885); 'Paese di Cuccagna' (1891); 'Addio Amore'; 'All 'Erta Sentinella'; 'Castigo'; 'La Ballerina'; 'Suor Giovanna della Croce'; 'Paese die Gesu,' between 1892 and 1902; 'Storia di due anime' (1904); 'Dopo il perdono' (1906); 'I capelli de Sasone'; 'Sterminator Vesevo' (1910); 'Evvivia la Vita'; 'Ella non respose'; and others. English translations of her chief works have appeared. Her early work distinguished for the vigor of its realism, acute sensibility and accurate observation, developed these traits with clearer insight and deeper psychological analysis in her later works. See LA BALLERINA; PAESE DI CUCCAGNA. Consult Croce, B., 'Matilde Serao' in *La Critica* (Vol. 1; Naples 1903); Dornis, J., 'Le roman Italien contemporain' (3d ed., Paris 1909).

SERAPEUM, the designation of Egyptian temples dedicated to the god Serapis. The Serapeum at Memphis was the most famous. It

was the cemetery of the Apis, and close to the Apeum, where the bull dwelt while in life. Within its precincts also were the dwellings of the priests, and a hospital for the sick, who flocked here to be cured by the dreams vouchsafed them by the god. The approach to the temple from the city was through an avenue of sphinxes. The ruins of the edifice, as well as the dromos of sphinxes, which had already become partially buried in the sand in the days of Strabo, were discovered by M. Mariette in 1850. After excavating a length of 7,000 feet, and uncovering 141 sphinxes, he discovered at the end of the avenue a semi-circle adorned with statues of the sages, poets, and philosophers of ancient Greece, and this is supposed to have formed part of the library of the Serapeum. Near this a transverse avenue led on the right to a temple of Apis, erected by Nectanebos, and on the left to the Serapeum itself. Further excavations disclosed the subterranean tombs of the mummies of the Apis. This great cemetery divided itself into two parts, the one, a vaulted gallery, containing 20 sepulchral chambers, of dates ranging from Rameses II to Psammetichus I; and the other, a souterrain, divided into a number of galleries, begun in the 52d year of Psammetichus I, and continued till the beginning of the Roman Empire. The bull mummies of this division were deposited in gigantic monolith sarcophagi of Syenitic granite, sometimes as high as 12 feet, with a length of 15 feet, and weighing upward of 60 tons. The dead bull was treated as a deceased human being, and the sarcophagi were accompanied by sepulchral vases and by the usual sepulchral figures offered to the dead. Votive tablets were placed over the lintels of the doors of the chambers, and as one of these always contained the date of the birth or discovery, the enthronement, and death or burial of the particular Apis, they have become of great importance in determining the chronology of the 19th and subsequent dynasties. They end with Ptolemy Euergetes II (177 B.C). The discovery of 146 papyri now in various museums), dating from the 18th to the 24th year of Ptolemy Philometor, shows that the temple was under the direction of prefects, delegates, vicars, sub-administrators and storekeepers. Two priestesses also served Æsculapius and Serapis, and certain male devotees lived in celibacy and seclusion within the precincts of the temple, which they never left. A large number of bronze figures and various other antiquities were also discovered among the ruins. The tablets found numbered 1,200, and altogether about 7,000 objects were discovered, nearly half of them referring to the worship of the Apis. See EGYPT.

SERAPHIM, a plural Hebrew noun which occurs only in one passage of the Bible, Isaiah vi, 2-6, where it denoted certain heavenly creatures of human form but having each six wings, with one pair of which they covered the face, with another pair the feet, and with the third pair did fly. Their station was above the throne of the Most High, and one cried to another, "Holy, holy, holy is the Lord of hosts." The prophet was in terror, conscious of his unworthiness and that he was a "man of unclean lips." Thereupon one of the Seraphim, taking from the altar a live coal in his hand, with it touched Isaiah's lips, purifying them and purging his sin. The Seraphim are in the later Jewish theology and in Christian angelology classed as the highest of the orders of angels, holding the first place in the first triad of the angelic hierarchy — Seraphim, Cherubim and Thrones. The word Seraphim, if it is of Hebrew etymology, means "burning ones." It is of the plural number, and the singular form is Seraph.

SERAPHIM, Order of. See ORDERS, ROYAL.

SERAPION, physician of Alexandria, of the sect of the Empirici, who flourished about the 3d century. He occupied himself almost exclusively with inquiries into the nature of drugs, and was a keen opponent of Hippocrates.

SERAPIS, sĕ-rā'pĭs, or **SARAPIS**, an Egyptian divinity whose worship was introduced into Egypt in the reign of Ptolemy I. It is related by Plutarch and Tacitus that Ptolemy having seen in a dream the image of a god, which he was ordered to remove from the place in which it stood, sent to Sinope, on the suggestion of a traveler named Sosibius, and brought thence a colossal statue, which he sent up to Alexandria. It was declared to represent the god Serapis, affirmed by Manetho to be Pluto or the Jupiter of Sinope. A magnificent temple was built at Alexandria for the reception of the statue of Serapis, and this temple — the Serapeum — was the last hold of the pagans in that city after the introduction of Christianity. Another temple of this god at Memphis, beside the Apis cemetery, was discovered by Mariette in 1850. (See SERAPEUM.) The Egyptians themselves never acknowledged him in their pantheon, but he was the principal deity in the Greek and Roman towns, and was considered to be either Osiris, Æsculapius, Jupiter or Pluto. Forty-two temples are said to have been erected to him in Egypt under the Ptolemies and Romans; his worship extended also to Asia Minor, and in 146 A.D. it was introduced to Rome by Antoninus Pius. The image of Serapis perished with his temple at Alexandria, which was destroyed in 389 by the order of Theodosius.

SERASKIER, sĕr-ăs-kēr', the name given to the commanders-in-chief of the Turkish armies, and particularly to the Minister of War. As applied in the latter sense the seraskier has very extensive powers, and is second only to the grand vizier.

SERBIA (*Kraljevina Srbija*), a kingdom in the Balkan Peninsula, now a constituent part of Jugoslavia, between lat. 42° 26′ and 44° 59′ N. and between long. 19° 18′ and 22° 52′ E. It is bounded north by Slavonia and Banat, the natural boundaries being the rivers Save and the Danube, east by Rumania and Bulgaria, west, after the Balkan Wars of 1912-13 and in conformity with the Treaty of Bucharest (1913), by Bosnia (from which it is separated by the river Drina), Montenegro and Albania, and south by Greece. Its area is 42,098 square miles, of which 23,448 square miles were added after the Balkan and World Wars.

Topography, etc.—The greater part of the country with Shumadiya (forest-covered land) as its centre, forms a high plateau in which intermingle the four mountain systems: the Dinaric Alps, the Carpathians, the Balkans and the Rhodopes. The Carpathian system is sloping gradually from Banat into Serbia across the Danube where it is broken by a very narrow defile, below Orsova, called "Djerdap" (Iron Gate) and consists chiefly of schist and other crystalline rocks and partly also of chalky limestone interrupted accidentally by certain species of rock of volcanic origin intermingled with different ores and coal. The high plateau formed in the northeast by the Golubinje mountains, between the rivers Morava and Timok, the precipitous heights in the mountain range Lukavitza (with *Rtanj* 1566 metres), the deep gorges and snow-covered summits of the Suva Planina and Shar Planina, offer most picturesque and romantic scenery. The mountain range in western Serbia with the Kopaonik, Jastrebac, Jadar, Rudnik, Cer, Ovchar, Kablar, Cer, etc., encircle central Serbia, which is densely covered by woods (oak, beech, pine, etc.). The Macdva and Morava valleys are considered the most fertile and beautiful regions of the kingdom. The rivers for the most part flow to the north, and none of them is navigable although the Morava, which traverses the land and divides it in almost two equal parts, and the Drina have large volumes of water. The Danube and the Save are navigable for small boats, and their banks are for the most part very low; thus they irrigate abundantly the adjacent valleys. Among the tributaries of the Danube the most important are the Save, the Morava, the Timok (which with the Danube separate Serbia from Rumania), the Mlava, the Pek and Porechka. Of the tributaries of the Morava the principal are the Nishava and the Ibar. The newly acquired territories of Old Serbia and Macedonia are watered by the Vardar, which might eventually be joined to Morava and form thus a most important waterway from Belgrade to Salonica, the Bregalnica, the Drim (or Drin), the Crna and the Treska.

Climate and Soil.—On the whole the climate in Serbia is centro-European, although the country is situated in the same latitude as northern and central Italy. Alongside the Save and the Danube the climate is rather temperate, the average annual temperature being +13° C., varying between 8, 34° and 15, 63°, but the more one goes to the south the more rigid winters prevail, which may be explained by the mountainous configuration of the soil of central and southern Serbia. Severe winters prevail in the region between the Suva Planina and Rudnik, lasting sometimes five to six months, and very low temperatures have been recorded, the lowest, however, being —25° C. Rains are abundant, especially in the spring and autumn, and most frequent in October, but summers are often alarmingly droughty, so that the peasantry often have recourse to superstitious rites ("dodole") and religious processions imploring Nature for rain. The most important winds are the Severatz (north wind) and the Koslava (east wind), neither of which, however, is as trying as in most other Mediterranean countries. The soil of Serbia is very fertile; all kinds of cereals growing in abundance, notwithstanding the very primitive manner in which they are cultivated. Of all the cereals maize is most widely cultivated for it serves as the principal food of the population. Wheat of a high quality is also grown and constitutes Serbia's chief article of exportation. Of no less importance are barley and oats which grow in abundance and serve chiefly as food for horses. All kinds of fruit are cultivated, apples, pears, peaches, grapes, etc., but the most important are plums of which there are many varieties, especially in the districts of Kruseval, Macva, Sabac, Obrenovac and Kragujerac. Plums are exported to a large extent, fresh and dried, also crushed and preserved in their own juice *pekmez* (marmalade). Excellent brandy "Slivovica" is made in a primitive manner from the surplus of plums and is highly esteemed in western Europe. A great area of southern Serbia is covered by vineyards producing delicious grapes, but Serbian wines have no quality on account of the very primitive method employed in this industry and they are for the most part exported to France for improvement whence they are re-exported over the world under the name of "Bordeaux." Flax and more especially hemp grow mostly in the central districts of Vranja and Vlasotinci and are acknowledged to be of the best quality known in the world. Tobacco of delicious flavor and aroma grows in Serbian Macedonia and the districts of Nish and Alexinac, but this industry is wholly monopolized by the government which makes the use of tobacco almost prohibitive.

Mining.— The mining industry in Serbia seems to be the oldest and the most developed, for there are archæologic remains in the mercury mines of Mount Avela, in the district of Belgrade, indicating that they have been worked from the Neolithic Age, and according to history silver mining constituted in the Middle Ages the principal source of wealth of the Nemanjichi's kingdom. As for gold there are remarkable formations in the diluvial and alluvial deposits of the rivers Timok and Pek, as also in the quartz veins and crystalline masses found in the department of Negotin and in the Majdanpek and Deli-Jovan. The Black River is famous for its alluvial washings, containing gold in trachytic rocks. But the most important of all Serbian ores are undoubtedly the unusually rich deposits of copper found in Bor, district of Pozharevatz, mostly in the shape of anticular masses of various pyrites but also, and especially at Majdanpek, in conjunction with iron sulphates, zinc and lead. Other important copper deposits have been found, and to some extent worked, in the mountains of Maljen, Povlen, Subovar and Vis. Lead ores are found in many parts in the valley of the Sava River (Podrinje), but none is of any great importance. However the Serbian government has built factories for smelting lead in the mountain of Krupanj. Zinc ores are frequent in Kuchajna and Rudnik, and nickel in connection with chrome oxide occurs in small quantities near the town of Kraljevo in the mountain of Suvobar. The most important mines of brown coal are those at Senje, and coal-beds of the Tertiary period and Tertiary lignite are to be found almost everywhere along the rivers Drina, Sava and Morava. There are several mines of liasic coal, mixed with sandy clay, at Dobra, Zajechar and along the river Timok, but the working of them is wholly inadequate and primitive. The quarrying industry (granite, lithographic stone, millstone and marble), and mineral waters is very sadly neg-

lected despite the most liberal concessions which the government grants to those who wish to exploit them.

Commerce and Industries.— As Serbia is pre-eminently an agricultural and cattle-breeding country the principal articles of exportation are cereals of all description, fruit (fresh and dried), cattle, sheep, wool, pigs and products thereof, wax, honey, and certain domestic dyes. But the foreign commerce in Serbia has been greatly hindered by the insufficient mileage of railways, navigable rivers and other ways of communication; most especially has Serbian commerce suffered on account of the absence of an outlet to the sea. Under the new régime Serbia enjoys the great advantage of seaports. Austria-Hungary was the natural consumer of Serbian products, but that powerful monarchy at all times exercised a rigorous policy toward Serbia, limiting the number of heads of Serbian cattle and pigs to a small minimum and subjecting the same to most vexing regulations, which led directly at first to the Tariff War in 1905 and then to the European War of 1914. The principal articles of importation into Serbia are paper and paper products, colonial ware, metallic products, clothes, glass and china, and machinery of all description. Before the outbreak of the European War Serbia had concluded treaties of commerce with all the most important countries, granting to the United States of America the clause of the most favored nation. Besides their agricultural and pastoral pursuits the Serbian population busy themselves with the manufacture of raw materials and some domestic industries, which are not only primitive but show a marked decadence. This is chiefly due to the apparent superiority and comparatively low prices of imported products over those made by the peasants themselves. Women work the wool, the hemp and the flax from which they make, with an admixture of cotton not only linen for shirts and underwear but even the cloth for outer clothing of both men and women of the family, while men — and especially those who have no large landed property — show great mechanical skill in shoe-making, for industry and other most elementary handicrafts. Much more could be said of the textile industry which is developed to a considerably high degree and which has earned a world-wide reputation for the Serbian rugs (manufactured chiefly in Pirot) woven on hand looms by women. Those rugs are much sought for on account of their solid workmanship, their original domestic designs and, most especially, their bright and permanent, natural coloring. But the most successful industry is flour-milling, which has been developed considerably owing to the natural advantage of water power and to the fact that the duty imposed by the late Dual-monarchy of Austria-Hungary on Serbian cereals was so high that the peasantry were forced to export them in the form of flour. The brewing industry is also prosperous in Serbia for it supplies almost the entire home consumption, but beer is not by any means a popular or widespread drink among Serbian peasants. Sugar refining, manufacture of cheese, meat-packing, and, to some extent, timber and metal industry constitute almost the entire employment of the land. With the exception of a few factories on the banks of the Danube and the Save, there are only small factories in the interior of Serbia; among those mention should be made of that at Vranjska Banja for treatment of hemp, at Leskovatz and Parachin for textiles. But on the whole industries in Serbia are only in their infancy, and the government realizing the great advantages which domestic industries bring to a country, is always prepared and even eager to grant most liberal concessions to persons, whether Serbian or foreign citizens, desiring to establish a new industry. The government grants to such enterprises not only free land necessary for the construction of factories and lodgings for workmen, but even exempts them from paying any custom duties on machinery, raw materials, and half-wrought articles of which they may have need in such factories. Furthermore the government sells to such industrials coal at the cost price and reduces the railway rates by 25 per cent from the fixed tariff.

Education and Religion.— Illiteracy in Serbia is very high, there being only about 20 per cent of the entire population who can read and write. Elementary schools are now to be met with it in nearly every little village and primary education is free and compulsory. In larger towns there are «gymnasia» (*Real* and *classic*) corresponding somewhat to the American high schools. In Belgrade there is a university with faculties of philosophy, law and engineering, a military academy, a state academy of commerce and a theological seminary. All these schools are entirely maintained by the state, and there are very few private educational institutions. The Royal Serbian Academy of Science publishes and rewards the works of deserving writers, scientists and artists, and spreads knowledge all over the country by means of its excellent periodical *Glas Akedemije Nauka*. Prior to the 7th century the Serbians, and indeed all the Southern Slavs, were pagans, but there is only a slender material available concerning their worship of nature. Soon after the Serbian immigration into the Balkan Peninsula, during the 7th and 8th centuries, Christianity which was already deeply rooted with the Byzantines, easily destroyed the ancient faith, not, however, without great struggle. Owing to the absence of competent interpreters of the Christian faith, and to the unintelligible manner and language in which it was enforced, as it were, on the population, great numbers of survivors of paganism remained in the Serbian provinces; most especially around the river Neretva. In the course of some thousand years Greco-Oriental myths and legends, ancient Illyrian and Roman propaganda and Christian legends and apocryphal writings, exercised so great an influence upon the ancient religion of the people that it is impossible to unravel from the tangled skein of such evidence as is available a purely Southern-Slavonic mythology, and throughout the Middle Ages, nay even to this day, the ancient worship of popular pagan divinities has persisted.

According to Constantine Porphyrogenitus the Serbians adopted the Christian faith at two different periods, first during the reign of the Emperor Heraclius, who had requested the Pope to send a number of priests to convert those peoples to the Christian faith. Yet the

Dalmatian Serbs remained pagans as late as the reign of Pope John IV (640–642). The Croatians already belonged to the Roman Church at the time when its priests were converting the Serbians to Christianity between the years 642 and 731, i.e., after the death of Pope John IV and before Leon of Isauria had broken off his relations with Rome. The second conversion of those Serbians who remained pagans was effected about 879, by the Emperor Basil I. The Grand Zupan Stefan Nemanja overthrew that subjection, but the Pope again succeeded, after Nemanja's death, in imposing his hegemony, only to be definitely overthrown by Nemanja's son Stefan Prvovenchani. The first Serbian archbishop was Rastko (later Saint Sava), Nemanja's youngest son, who was crowned by the Royal Wreath which King Stefan Prvovenchani obtained from the Pontifex Maximus. But the great Serbian ruler, Emperor Dushan the Mighty, brought the Serbian Church to its apogee when he elevated (in 1346) the Serbian archbishopric to the degree of Patriarchate, an act which drew upon it an anathema from the ever-jealous Patriarchate of Constantinople. When the Serbian Empire was lost on the battlefield of Kosovo (1389), and subjugated by the Osmanli Turks, the Church became a centre of nationalism, and in the course of nearly five centuries of Ottoman dominion, planned the insurrection against the oppressors. But the dominion was unbearable, and Serbian patriarch Arsenije Crnojovich fled to Austria-Hungary, together with 37,000 Serbians. His example was followed by one of his successors (1738) whose name was also Arsenije. In the beginning of the 19th century the Greek Phanariots associated themselves with the tyrannic Pachas in the Serbian lands and gave a mortal blow to the Serbian Patriarchate of Pech (Ipek) and abolished even the Serbian episcopal see. But Prince Milos Obrenovich of Serbia succeeded in restoring the autonomy of the Church, giving the entire rule to the archbishop of Belgrade, Melentius, with the title of Metropolitan of Serbia. The election of the Metropolitan, however, was subject to the approval of the Patriarch of Constantinople who was to receive also a tribute in money; and it was only in 1879 that the Serbian Church became entirely independent. The present state religion in Serbia and Montenegro is the Eastern-Orthodox, and it maintains a union with the Universal Eastern Church. Serbia is divided in eparchies, the eparchs being elected by the Council of Bishops, which has the highest ecclesiastical authority. There are the High Ecclesiastic Judicial Court, the diocesan ecclesiastic courts, the department arch-priests and the deans of districts, and the parish priests. Public worship by other denomination (Catholics, Protestants, Jews and Mohammedans) is allowed in Serbia by the law, but the authorities of all religions are placed under the control of the Minister of Public Instruction and Public Worship.

Finance.— The principal revenues are derived from direct and indirect taxes imposed on every citizen and owner of property, customs duties, excise, state monopolies of salt, sugar, tobacco, matches and petroleum. Prior to the Treaty of Berlin, Serbia had practically no debts but the construction of the International railway from Ostend to Constantinople forced Serbia to construct her part and to enter into European financial markets and to conclude, in a rapid succession, the following loans: (1) Russian loan ($1,200,000); (2) Lottery Loan of 1881 (2 per cent) $4,945,000; (3) Loan from the Serbian State Mortgage Bank (5 per cent) $1,455,000; (4) Primary loan of 1888, $1,835,000; (5) Unified loan of 1895 (4 per cent) $67,580,000; (6) Railway loan of 1899 (5 per cent) $960,000; (7) Monopoly loan of 1902 (5 per cent) $2,300,000; (8) State loan of 1906 (4½ per cent) $18,835,000. The war loans of 1912–18 are yet unknown but they certainly exceed $1,000,000,000. The State Budget in recent years has exceeded annually $60,000,000 one-third of which is generally expended by the war office.

Railroads and Transportation.— Railways in Serbia have a total length of about 1,000 miles consisting of the following lines: (1) Belgrade-Nish; (2) Belgrade-Semendria; (3) Nish-Vranja-Risbovatz-Uskub-Gjevgeli; (4) Stalat-Uritze; (5) Nish-Pirot-Tzaribrod; (6) Belgrade-Valjevo; (7) Nish-Knjazevatz; (8) Paratyin-Zaietchar-Negotin; (9) Uskub-Mitrovitza; (10) Monastir-Greek frontier. Navigation on the Danube and the Save is of enormous importance in Serbian economic life. Apart from the steamships (about 15 in number) owned by the Serbian government and private companies, there are two foreign navigation companies, one Austrian and the other Russian. Roads and highways connecting principal towns in Serbia are fairly well constructed but the roads between smaller towns and villages are in very bad condition chiefly owing to the mountains and the rocky nature of the soil. The rivers Morava and Vardar, which traverse the country, are navigable only for very small boats.

History.— The region inhabited at present by the Serbian race (Serbia proper, Montenegro, Bosnia, Herzegovina, Dalmatia, Croatia, Slavonia, Istria, Backka, Banat, Syrmia (Srem), the Sandjak of Novi Bazaar and Macedonia, was originally populated mostly by Thracian and Illyrian tribes, and ruled at first by Macedonia, then, during the 1st century, by the Romans. In this fertile and picturesque country flourishing towns sprang up on the banks of the Danube (*Singidunum*, to-day *Belgrade*) and the Morava (Naessus-Nish), but during the following centuries, lying as it does close to the great highway through Europe, it was overrun in succession by the Huns, East Goths and Langobards, and brought, about A.D. 550, under the sway of the Byzantine Emperor Justinian, only to be torn from his successors by the Avars, who again laid it waste. It was at the beginning of the 7th century that the Serbians descended from the Carpathian slopes to the shores of the Black Sea, thence moved westward along the northern bank of the Danube, and, crossing the river, settled mostly in the same territories which they inhabit at the present time. Under what circumstances and under what leaders they effected their migration is unknown, but the ancient inhabitants of these regions (Latins, Illyrians, Thracians, Grecks, and the Pelasgs) seem to have been easily driven toward the Adriatic Coast. Their emperor, Heraclius (610–641), unable to oppose an effective resistance, ceded to the Serbians all the provinces which they had occupied and peace

was thus purchased. The pagan and uncultured Serbians came now into constant intercourse with the civilized Byzantines, and soon (from 7th to 9th century) were converted to Christianity, especially by the so-called Slav apostles Cyrillos and Methodius, who translated the teaching of Christ into the ancient Slavonic language. As the Serbians during the 7th and 8th centuries were divided into many tribes, they became, despite their warlike character and innate bravery, an easy prey to the attacks of the Byzantines, the Fino-Bulgars and the Franks, but they never were subjugated by any of their aggressors. The Serbians, however, were forced to realize that only by centralization of their power could they offer resistance as a nation, and several efforts were made to found a state on the banks of the Morava, with Korea Margi (now called Chupriya) as its capital, in the early part of the 9th century, but owing to the hostility of the Bulgarians, this proved abortive. At about that time, Bosnia, which was one of the Serbian *Zhupanias* (county), severed her relations with the other Serbians and formed an autonomous *banstro* (i.e., province, ruled by a *ban* or prince). Zupan (or Zhupan, count or prince) Vlastimir succeeded in emancipating his province from the Byzantine suzerainty and established an independent state called Rashka, extending around the rivers Piva, Tara and Lim, touching the basin of the river Ibar in the east and that of Vrbas in the West. But in the very beginning of their civil life there were dissensions among the leaders which facilitated the interference of the Bulgarian chieftain Simeon, who took into captivity a Serbian rebel Chaslav and supported him in his claims to the throne of Rashka. At about 931, however, Chaslav succeeded in wresting from his Bulgarian ally Simeon a new state which comprised, together with Rashka, the territories of Zetta (to-day Montenegro), Trebinje, Neretva and Hum. After his death great disorder reigned in the principality. In the course of the following century the Byzantine emperors, having again brought the now enfeebled Bulgaria within their rule, also overpowered Rashka, whose Grand Zhupan fled. The ruler of Zetta Zhupan Vojislav (1031–51) took the opportunity of declaring himself king of the Slavs (*rex Sclavorum*). He was acknowledged in that dignity by Pope Gregory VII in the year 1077. Under the rule of King Bodin, the son of Mihajlo, the Serbian of Chaslav was restored, and Bosnia was annexed. But after Bodin's death new disorder ensued, caused mainly by the dissensions among the several and ever malcontent pretenders to the throne. Despite all the unfortunate internecine strife, which has been the most fatal, and constant, feature of Serbian rulers of all times, the Grand Zhupan Stefan Namanja (1169–96) defeated, in a deadly battle, his own three brothers, and then began an epoch of two centuries of complete independence for Serbia and a dynasty which covered the country with military glory. Nemanja succeeded not only in uniting under his sceptre all the provinces held by his predecessors, but also in annexing those (Ham, Scutari, Cattaro, etc.) which never had been Serbian before, and he placed Ben Kulin, an ally, upon the throne of Bosnia. Nemanja abdicated in favor of his able son Stefan, and withdrew into monastic life, together with his youngest son Saint Sava. Stefan Nemanjich, who was the first crowned king of Serbia, had to struggle with his elder brother, Vukan, and with the Holy See. Vukan as the rightful heir to the throne antagonized his brother Stefan, using the influence of Hungary and the popes. When the Crusaders took Constantinople, Saint Sava, Nemanja's youngest son, succeeded in emancipating the Serbian Church from the influence of the Patriarchate of Constantinople, and obtained complete autonomy (1219), becoming himself the first Serbian archbishop. King Stefan Prvovenchani was succeeded by his worthless son Radoslav (1227–33), only to be dethroned by his brother Vladislav (1233–42), who was in no wise of any greater importance to the Serbian people, and who was removed from the throne by his third brother Urosh the Great (1242–76). This ruler wisely availed himself of the German miners who were ousted by the Tartar invaders of Hungary, and who developed to a high degree the exploitation of the Serbian mines (especially silver); thus the Serbian state became one of the wealthiest in Europe. But this prince was dethroned by his eldest son, Dragutin, after a bloody battle in Herzegovina, only to be himself ousted from the throne to a monastery by his brother Urosh II Milutin, whose reign (1281–1321) was marked by his conquest of Macedonia. He also reduced to obedience Shishman, a Tartar satrap of the Bulgarian province of Vidin. In the meantime Dragutin obtained from his mother-in-law, the Queen of Hungary, as fief, the lands between the rivers Danube, Save and Drina, and assumed the title of King of Sirmia, but he yielded the greater part of that territory and his title to his brother Milutin, while the remainder was left under the suzerainty of the kings of Hungary. After Milutin's death, the usual fatal discord arose concerning the succession to the throne. However, order was re-established by Milutin's son Stefan Dechanski, whose reign is remarkable for his glorious and complete victory over the Bulgarians in the memorable battle of Velbuzhd (Kustandil) 1331, in which the Bulgarian ruler was killed. In commemoration of that victory Stefan built the magnificent monastery of Dechani, from which he obtained his name "Dechanski." The whole of Bulgaria came under the sway of a Serbian king. Stefan Dechanski was dethroned, and, according to all appearances, strangled by his own son Dushan the Mighty (1331–55), under whose glorious rule Serbia reached the summit of power. He aimed to establish his sway over the entire Balkan Peninsula, for he had a curious presentment of the Ottoman invasion, and having overpowered nearly the whole of the Byzantine Empire, he proclaimed himself, in agreement with the *Vlastela* (Assembly of Great Nobles), Tsar of Serbia. Furthermore, that prince elevated the Serbian archbishopric to the dignity of the patriarchate and subdued the whole of Albania and Epirus as far as Janina. Thanks to the dissensions between Emperor John V. Paleologus and the notorious Prince Kantakuzen, Dushan succeeded in overpowering and annexing to his state the whole of Macedonia, with the exception of Salonica and Thessaly. In 1349 Ban Stefan Kutromanich of Bosnia pil-

laged Trebinje, but Tsar Dushan was unable to chastise that rebel on account of the threatening danger from the Turks, whom Kantakuzen had now brought over to forward his ambitions. Always conscious of the Turkish danger, Tsar Dushan espoused Princess Helen, the daughter of the newly-elected Bulgarian ruler John Strazimirovich, and started energetic negotiations for an alliance between Serbia, Bulgaria, Venice, Hungary and Pope Innocent; to the people he promised even to introduce the Catholic faith provided he were named the commander-in-chief of all the Christian armies in a crusade against the Turks. His sudden death, in December 1355, frustrated his ingenious plan and marked the beginning of the Serbian downfall. In the interior administration, Tsar Dushan's epoch is marked by the development of commerce and industry, construction of roads and highways, and most especially by his memorable "Zakonik" (code of laws) governing customs and ordinances of his predecessors and ratifying the privileges of the clergy and nobility. As Dushan's son, Urosh the Weak, was not of age at the time of his father's death, the rule of the country passed to one of the vassals of Macedonia, King Vukashin, who, together with his brother and other lords, held independently the whole territory adjoining Prizren to the south of the mountain in Sar. Profiting by the dissensions amongst the Serbian lords and the weak rule of Urosh (1356–67), the Byzantines rescued Macedonia while the Hungarians took back Belgrade. Soon Epirus, Acamania and Thessaly were lost, and governors of other provinces in rapid succession renounced obedience to the new king. In 1371 Emperor Urosh the Weak was killed while hunting (according to all likelihood by the hand of King Vukashin), and with him the dynasty of Nemanjices died out and Serbia virtually lost her independence. The haughty Vukashin proclaimed himself king, and in co-operation with his brothers, gathered an army of about 80,000 men to resist the already well-advanced Turkish invasion now threatening Serbia. His armies, however, although successful at first, were surprised on the night of 20 Sept. 1371, by the Turkish cavalry and annihilated on the banks of the Marica. Both King Vukashin and his brother perished in that disaster, and Prince (Kraljevich) Marko, the favorite hero of the Serbian National Poetry, proclaimed himself king of the Serbians, but the assembly of nobles, in their session at Pech (Ipek) in 1374, placed the crown of Serbia on the head of Lazar Hrebeljanovich, who assumed the modest title of *Kneh* (prince), and who subdued not only Prince Marko but also the other princes and barons. Furthermore, Prince Lazar caused the Patriarch of Constantinople to withdraw his anathema from the Serbian Church, and even to recognize the autonomy of the Serbian patriarchate, but Ban Turtko of Bosnia, who was a descendant of the Nemanjich dynasty, endeavored to uphold that tradition and crowned himself king of all Serbia in the Monastery Mileshevo. Prince Lazar, instead of declaring war on that ambitious prince, succeeded in making an alliance with him, and gathered an army of about 100,000 men with which he faced the forces of Sultan Murat (numbering over 300,000) but, partly because one of the malcontents, Vuk Brankovich, betrayed his sovereign by misleading his 12,000 horsemen, and partly because the alliance with Ban Turtko proved abortive, the Serbian armies were utterly annihilated in the disastrous battle of Kossovo (15 June 1389). Prince Lazar was captured and beheaded, and Sultan Murat perished by the hand of a Serbian knight, Prince Milosh Obilich. That unfortunate disaster, although it did not crush the Serbian state, left upon the Serbian people a deep impression and a cycle of most beautiful epic poetry immortalized the event. (See SERBIAN LITERATURE — *Serbian National Poetry*). The tottering Serbian state came now under the sceptre of Lazar's son Stefan Lazarovich (1389–1427) who fought the Turks in several battles of minor importance, but, owing to overwhelming numbers of the enemy, was compelled to cede his realm to the victor. After his death he was succeeded by the grandson of Lazar's daughter Djuradj Brankovich (1427–57), but all his efforts to shake off the Ottoman dominion remained without avail. When Despot Djuradj died the nobles could not agree concerning his successor, and in the disorder that ensued the Turks completed their conquest of Serbia in 1459 and invaded Bosnia. The last Tomashevichs fled to Rome, and the flower of Serbian aristocracy which survived the Battle of Kossovo, took refuge in the Orthodox Courts in Wallachia and Moldevia, in Dalmatia and Hungary. Some of them fled even as far as Scotland and Ireland. The subjugation of Bosnia was an accomplished fact by 1453, and Herzegovina followed her fate in 1482. But the only orthodox Serbian state that never succumbed to the Turkish pashas was Montenegro (Zrna Gora), whose mountains, inaccessible to the Ottoman horsemen, became the nests of *Hajduks* and *Uskoks* (guerilla warriors), members of the Serbian high aristocracy. Albania, with her chieftain of Serbian descent, George Kastriotovich, surnamed Skandarbeg (1443–68), offered a stubborn resistance in a series of battles (see ALBANIA), but finally was subdued by the overwhelming foe. The cruel nature of Turkish rule soon forced thousands of Serbia's best families to emigrate and join their brothers in Southern Hungary (Bachka, Banat, Croatia and Syrmia). Those who remained were either forced to embrace Islam (which was especially the case in Bosnia), or to live as *raya* (slaves), for the Turkish *spahis* (landlords) confiscated the land hitherto belonging to the native nobles.

But when the *hajduks* and *uskoks* abandoned their original plan — that of exercising a check on occasional tyranny of certain haughty Turkish pashas and sparing and protecting the helpless Christian population, and made both highway robbery and murder their profession, the iron hand of the Turkish rule was bitterly felt, and with the beginning of the 17th century, especially after the wars between the Turkish and Austro-Hungarian empires in which the Serbian volunteers helped Austrian ambitions, an epoch of terror began on the part of the Turks, and cruelties of indescribable baseness became the regular occupation of the *Janissaries* and *Dahis* for, after the conclusion of the Treaty of Svishtov (1791) the Sublime Porte gave guarantee that the Serbian volun-

teers would not be punished for their uprising and four Dahies were murdered, the pacific vizer of Belgrade, the Mustafa Pasha, as well as more than a hundred popular and prominent Serbians. This they did for fear lest a fresh insurrection should be instigated by the leaders. There were some prominent Serbians who took refuge in the mountains, inaccessible to the Turkish horsemen, and elected George Petrovitch (or as the Turks called him Kara-George, i.e., Black George) as their leader. The rebellion was organized and started in January 1804. Under the leadership of this great strategist the Serbians fought successfully and recovered from the Dahies the entire Pashalik of Belgrade. However, the Turks profited by the engagement of Europe, and more especially of Russia, in the struggle with Napoleon, and sent large armies in three different directions which subdued the insurgents and subjugated the territories won by them. George Petrovitch and other leaders left the country to seek aid, first in Austria and later in Russia. In this absence Milosh Obrenovich, one of Kara-George's lieutenants, made a fresh attempt to liberate the Serbian people from the Ottoman yoke, and in 1815 was successful in re-establishing the autonomy of the Belgrade Pashalik. During the progress of his operations, George Petrovitch returned to Serbia, but was assassinated at Smederevo (Semendria) by order of Milosh, who then proclaimed himself hereditary prince of the occupied territory, and was approved as such by the Sublime Porte in October 1815. While very wise in home affairs, Milosh openly opposed Russian influence in Serbia and incurred the bitter hostility of that power, which forced him to abdicate in 1839 in favor of his son Mihajlo. This young prince was a very subtle diplomat, and rescued from the Turks, and annexed to his independent state several important Serbian towns. He was banished in 1842 and was succeeded by Alexander Karageorgevich (1842–60) son of Kara-George Petrovitch. Under the prudent, though meek, rule of that prince Serbia obtained a modern constitution, but an unfortunate foreign policy and the corruption of the Serbian statesmen forced him to abdicate the throne and leave the country. The Skupshtina (or national assembly) restored Milosh in 1860, but he died the same year. His son Mihailo succeeded (1860–68), but was assassinated at Topchider, near Belgrade. As Milan, the only heir, was not of age, a regency of three (Blaznavaz, Gavrilovich and Ristich) was appointed, and secured from the Porte an acknowledgment of the young prince as hereditary ruler. They framed (in 1869) a constitution measurably satisfactory to the conflicting political parties. When Milan attained his majority in 1872 he ascended the throne and soon precipitated a war against Turkey (1876–78) which resulted in the annexation to Serbia of a few new districts. The Treaty of Berlin acknowledged Serbian independence, and in 1882 the principality of Serbia was proclaimed a kingdom. The unfortunate war against Bulgaria in 1885, which was instigated by Austria and by which Milan hoped to prevent his neighbors from annexing East Rumelia, forced that haughty prince (in 1888) to grant a liberal constitution to his people in order to retrieve his lost position. However, his unpopularity, aggravated by his enforced divorce from Queen Nathalie, made it necessary for him to abdicate in favor of his 12 years old son Alexander. During Alexander's minority the executive power was delegated to a regency under the leadership of Ristich. At the age of 16 Alexander deposed the Regency by a well-planned *coup d'état* (in 1893), and in the following year he abrogated the constitution of 1888 and restored that of 1869. In 1900 he married his former mistress, Draga Mashin, under whose influence he entered upon a period of tyranny almost Neronian in type, thus alienating his people and his friends and playing into the hands of his enemies who finally murdered him in 1903. The National Assembly (Skupstina) immediately elected to the throne Prince Peter Karageorgevitch son of Prince Alexander and grandson of Kara-George Petrovitch, who had spent a long life in exile and whose reign forms a most important epoch in Serbian history. Strictly constitutional, he gave *carte blanche* to his cabinet headed mostly by M. Nikola Pashitch, to whom Serbia was indebted for avoiding war with Austria on more than one occasion. With the growth of trade and industry, for which M. Pashitch established a new and solid basis, Serbia's position of complete economic dependence, on the openly hostile or extortionate markets of Austria-Hungary, became more and more impossible, for exportation to and importation from that monarchy began rapidly to diminish, and in order to obtain some relief from this thraldom Serbia concluded, in 1906, a customs treaty with Bulgaria. To this Austria replied by a war of tariffs, the so-called "Pig-War"; swine being one of the most important items of Serbia's export trade. The resulting economic crises, which, however, were soon overcome by new routes to Egypt, France and England, greatly embittered the peasantry against Austria-Hungary and indirectly led to a closer *reapproachment* with Russia. Still more hostile was the dual monarchy, when she clearly saw that her policy of impoverishing her neighbors and then crushing them, proved futile, for Serbia revised and concluded new treaties of commerce with almost all European countries and manifestly showed herself as a fully-grown member in the family of nations. Profiting by the disorder caused in Turkey by the young Turks, and bitterly opposed to the just aspirations to a union of the Southern Slavs (or Jugoslavs), Austria threw a bombshell among the European Powers, signatory of the Treaty of Berlin, in wanton violation of that "scrap of paper" by annexing Bosnia and Herzegovina, which provinces of the Ottoman Empire she had administered for the previous 30 years. Serbia was in no mood to acquiesce, for all the Jugoslav provinces, notably Bosnia and Herzegovina, were conscious of their fundamental unity of race, language and aspirations with the Serbians, and were looking to the free kingdom of Serbia to lead them all toward independence, as Piedmont had led the other Italian states in 1860. In July 1912, Serbia, Bulgaria, Montenegro and later Greece formed a league, known as the Balkan Alliance, and the respective governments delivered to the Porte an ultimatum embodying the demand that autonomy should be granted to the European provinces under Ottoman rule. At the same time, on 30 Sept. 1912, they began to mobilize their forces, to which Turkey replied with similar measures. The Powers at once made an ineffectual attempt to intervene and urged patience on the Balkan Alliance, while a joint note was presented to Turkey inviting immediate discussion of reforms in Macedonia. But the Balkan Allies, having determined not to be played with any longer, pushed events beyond the control of diplomacy, and on 17 September Turkey declared war on the recalcitrants. The Serbian forces totalled 330,000 men and were divided into four armies. While the first three armies converged upon Skoplje (Uskub) the fourth army was detailed to clear the Turks out of the Sandjac of Novi Bazaar and to proceed to the assistance of Montenegro. The decisive battle of the entire campaign, in which the Ottoman forces were crushed, took place on the field of Kumanivo before Uskub. In Albania the Serbians and Montenegrins took Ljesh (Alessio) and Drach (Durazzo), and in Macedonia the Serbian troops were successful in every battle, notably in those for Prilip, the birthplace of Serbia's national hero Prince Marko, and Bitolj (Monastir), while the Bulgarians invested Adrianople which finally fell into the hands of the Allies, thanks to the powerful help of the Serbians (50,000 men and 120 siege guns) rendered beyond the stipulations of the treaty. The London Conference (1912–13), hard pressed by the Austro-German menace, erected a new political state (which had never in history existed as such) under the name of Albania. The Montenegrins were ordered by the Powers to quit Scutari and the Serbians to evacuate the dearly won ports on the Adriatic, being allowed only a commercial route to that sea. The results of the entire campaign exceeded all the expectations of the Allies. As the Bulgarians had promised in that treaty to help Serbia with 200,000 men in case Austria should attack her, and as that aid was not needed nor given, but, on the contrary, Serbia had helped Bulgaria to secure Adrianople and Thrace, and in order to preserve European peace from threatening Germany and Austria, Serbia had abandoned Albania and her absolutely indispensable ports on the Adriatic, the necessity for a revision of that treaty was strongly felt, Bulgaria, however, absolutely refused to entertain the suggestion, exacting from Serbia the abandonment of the southern part of Macedonia as far as Monastir and the lakes which had fallen to the Serbians, and insisted on forcibly occupying Salonica which was conquered by the Greeks. The Bulgarian government even refused to submit, in accordance with the third article of the Secret Appendix of the Serbo-Bulgarian Treaty of Alliance of 1912, the case for a final decision to Russia, and advanced secretly, and endeavored to surprise the Serbian armies on the night of 29 June. But the ingenious Serbian General Putnik utterly routed the Bulgarian forces in the memorable battle of Bregalniza. By the peace that was concluded at Bucharest, Serbia shared the Sandjak with Montenegro and retained Macedonia north of the Ochrida-Doiran line with the promise of a railway outlet on the Adriatic. Having settled the point in a broad and generous spirit, Serbia gladly hung up her sword and prepared for a period of peace and recuperation of social and industrial advancement. On 28 June 1914, the Archduke Franz Ferdinand, heir to the Hapsburg throne, and his consort were murdered, under most mysterious circumstances, in the streets of Serajevo, the capital of Bosnia, by two fanatic malcontents who were natives of Bosnia and Austrian subjects. On 20 July the Austro-Hungarian Minister in Belgrade handed to the Minister for Foreign Affairs a note charging Serbia with fomenting a revolutionary propaganda within the territory of the Dual Monarchy. It was asserted that the Serajevo assassinations were planned, and the murderers equipped, in Belgrade. Among other demands the Austro-Hungarian government exacted from the Serbian government (paragraph 4) the removal from the army and civil service of a number of officers and officials guilty of anti-Austrian propaganda, whose names would be furnished by the Austrian government (paragraph 5); to accept the collaboration in Serbia of agents appointed by the Austro-Hungarian government, for the suppression of the subversive movement (paragraph 6); to institute a judicial inquiry into the crime of 28 June; this inquiry to be held in Serbian territory, Austro-Hungarian delegates to take part in this investigation, etc. The French and British Ambassadors and the Russian Chargé d'affaires expressed indignation at the form, contents and the time-limit (48 hours) of that note and declared it to be inacceptable by any sovereign state in the world. The Serbian government unreservedly accepted all the demands of Austria-Hungary, except paragraphs 5 and 6, and promised to revise those articles of the constitution which stood in the way of these demands, and declared its readiness to refer any disputed point either to the Hague Tribunal or to the Powers who had taken part in the settlement of the controversy concerning the annexation of Bosnia and Herzegovina. Refusing the Serbian answer, the Austro-Hungarian government declared war on Serbia on 28 July 1914, which was followed by a desultory bombardment of the defenseless city of Belgrade. In spite of the German ambassador's assurances that Russia, being unprepared, would remain passive, and that the war on Serbia would be a mere "punitive expedition" which would be ended before the Powers could intervene, Austria awoke to the startling fact that Russia was beginning to move, and on 31 July, Vienna consented to eliminate from the ultimatum those demands which involved the violation of the sovereignty of Serbia. It was too late. Germany, having jockeyed Austria into a position from which there was no escape, declared war on Russia the next day. The Serbian army was entirely unprepared for the new war, for little or none of the wastage in the Balkan wars had as yet been made good, and the orders placed abroad, chiefly in France, for cannon, rifles, munitions, clothing and stores, had not yet been filled; heavy guns, automobiles and flying machines were almost completely lacking. Not before 12 August did the Austro-Hungarian troops (80,000 men) make a definite invasion at Loznitza and Lesnitza, but Vojuoda Putnik met them in the Cer mountain and routed them at Belikamen. It was not to be expected that Austria would accept as definite the blow inflicted on her

military prestige at the battles of Belikamen and Jadar. Having made good their heavy losses the Austrians advanced again with a fresh army of 250 battalions of infantry and numerous guns, and took by surprise the Suvohor mountain. Retreat on the part of the Serbians was imperative on account of the lack of ammunition. However when the long-expected munitions arrived, about 23 December, the Serbians rapidly retook the line Lazaravac-Valjero-Uzice, and the enemy was hurled back across the Drina. Belgrade, which had been evacuated by the Serbians, soon fell a victim to the violent artillery of the Serbian attacks from the surrounding hills. The pontoon-bridges having been subject to a fierce fire from the Serbian heavy guns the Austrian debâcle was complete. They left behind in Serbia 40,000 prisoners and hundreds of guns, with the transports and stores of a vast army. Almost the entire year that ensued passed in a comparative quietness that gave the Serbians time to rest and recuperate. But in July 1915 Bulgaria signed a secret treaty of alliance with Austria-Hungary and renewed those concluded in 1908. This gave hopes to the Austrians, and aided by several Prussian and Bavarian divisions, they attacked Serbia in October 1915 from the north and the Bulgarians attacked from the south. Against these odds the Serbians fought desperately, but finally were forced to retreat through Albania, which they found as hostile as their own ally Greece. This retreat constitutes the summit of human endurance and the saddest page in Serbian history. The few remnants of the Serbian army, and the great mass of the non-combatant population, found a refuge in Corfu, Italy and in southern France. The mysterious surrender of Montenegro and the escape of King Nikolas to France and his son Prince Mirko to Vienna aggravated the national cataclysm of the Serbian people. See War, European.

An agreement was reached at Geneva, 7 Nov. 1918, by the Serbian Prime Minister and delegates to the National Council at Agram as the governing body of the Serbs, Croats and Slovenes. Under this agreement the Jugo-Slavs of the former empire of Austria-Hungary became incorporated with Serbia and sought recognition from the Entente Powers of the Agram National Council as the *de facto* and *de jure* government of the new Jugo-Slav state. The government of the new state is a limited monarchy in form, with a bicameral parliament. By 21 December the terms of union between Serbia and her sister Slovak states were agreed upon and a ministry representing them all was formed.

Government.— After the catastrophe of 15 June 1903 in which the last member (Alexander) of the Obrenovitch dynasty perished, the constitution of 1888 was restored. By that constitution the legislative power is shared by the king (the dynasty of Karageorgevitch) and the Skupshtina (or National Assembly), while the executive authority is in the hands of the Council of Ministers (eight in number) appointed by the sovereign. The Skupshtina, too, can force the Cabinet to resign as soon as it cannot command the confidence of the national representatives. The members of the Skupshtina are elected by *scrutin de liste* by entire counties (i.e., departments), the number of which varies (from 4 to 12) according to the population of each department. The deputies are inviolable and irresponsible during their term of office, before the courts for whatever they say in the Skupshtina. All Serbians who are of age and pay direct taxes are eligible, but each department must have at least two candidates, apart from the general conditions and requisites prescribed by the constitution, who must possess a university degree or its equivalent in order to assure the representation of the educated classes, for nine-tenths of the Serbian population are illiterate peasants. The Skupshtina consists of only one chamber, whose deputies are elected almost by universal suffrage as the voting right is granted to all Serbians who are 21 years of age and who pay 15 dinars (about $5) yearly in direct taxes. The deputies have the right to impeach ministers of the state and possess the sovereign right of controlling the budget. Although the sovereign has the right of convoking the Skupshtina in ordinary or extraordinary session, of closing and proroguing the sessions and of dissolving the Assembly, he cannot paralyze its work or exercise a determining power over the course of state affairs, for the constitution expressly ordains that the Skupshtina shall be convoked in ordinary sessions each year which cannot be closed before the budget for the following year has been voted. The constitution provides also for a Council of State (Senate with 12 members) which is the highest administrative body, passing resolutions in judgments between the state authorities and the autonomous authorities, exercising supreme supervision over the carrying out of the various electoral functions, and its advice must be taken upon all projects of law (bills) which are to be presented to the Skupshtina. The members of the Council of State are irremovable and independent, and six of their number are elected by the Skupshtina from a list of candidates presented by the king, and the remainder are appointed by the king from a list of candidates drawn up by the Skupshtina. Besides the ordinary Skupshtina there exists the Great Skupshtina which is convoked only on very important occasions, such as election of the new sovereign or establishment of succession to the throne, amendments of the constitution, cession or exchange of the territories of the state; or it can be called even by the king himself if he deems consultation imperative. Serbia is divided into departments (*okrugs*), arrondissements (*srezovi*) and communes (*opshtine*). The governor of the department is the representative of the central power. Justice is rendered by the courts of the communes, courts of the departments, the court of appeals and the Supreme Court or the Court of Cassation.

Army.— In accordance with the Law for the Organization of the Army, voted by the National Skupshtina in 1901, compulsory service in the army is general for all able-bodied men; those who are unfit for military service must pay 30 per cent additional indirect taxes. The military forces are divided into the national army and the home defense, the former beginning at the age of 21 and ending at 45 inclusive and consisting of three categories, while the latter lasts from 18 years to 21 and from 45 to 50. The terms of service in the standing army are two years in the cavalry and artillery and 18 months in all other arms. For the educated classes there exists a shorter term of six months, provided the candidate passes successfully the examination qualifying him for the rank of sub-lieutenant in the reserve. Those who fail at the examination must serve 14 months. The enrolment of recruits takes place every year in July and August. The minimum height of the recruits is 150 centimetres and chest 78 centimetres (60 and 32 inches respectively). Previous to the Balkan wars of 1912 and 1913 (since which Serbia has doubled her territory and population) the standing army consisted of five divisions of infantry; one division of cavalry of four cavalry regiments, each of four squadrons and two-horse batteries; one fortress artillery team of two battalions; one regiment of mountain artillery of seven batteries; one command of engineers and one battalion of pioneers; two companies of cantoneers; one company of railway men; one company of telegraph men; one company of miners; and the royal guard consisting of one squadron of cavalry and one company of infantry. In the Balkan War of 1912 the entire Serbian army numbered 350,000, but in 1914 its strength was estimated between four and five hundred thousand. At Belgrade there is a very high class military academy for the training of officers, and at Kragujevatz there is an artillery school for non-commissioned officers. The standard of military education can be compared favorably with that of any first-class military power in Europe.

Political Divisions and Population.— The departments of Serbia, with their areas and populations, are as follows:

DEPARTMENT	Area in square miles	Population 1910
Old Territory		
Belgrade	782	155,815
Valyévo	949	157,648
Vranyé	1,676	252,937
Kraguyévatz	886	189,025
Krayina	1,123	112,142
Kruzhévatz	1,046	167,371
Morava	1,120	203,638
Nish	988	198,768
Pirot	934	112,314
Podrinye	1,371	238,275
Pozarevatz	1,605	259,906
Rudnik	606	85,340
Smederevo	493	143,216
Timok	1,234	149,538
Toplitza	1,096	110,218
Ujitzé	1,270	146,763
Chachak	1,466	138,911
Belgrade City	5	89,876
Total (Old Territory)	18,650	2,911,701
New Territory		
Novi Bazar	.....	133,401
Pristina	.....	239,386
Pljeolja	.....	62,601
Kumanovo	.....	166,939
Skolpje	.....	153,293
Debar	.....	82,476
Kavadar	.....	97,763
Bitolj	.....	315,759
Tetovo	.....	157,248
Prizren	.....	227,425
Stup	.....	67,575
New Territory 1918–19	.....	.....
Total (New Territory)	23,448	1,703,866

The area of Serbia is therefore 42,098 square miles, with a population of 4,955,631 of whom 2,911,701 inhabit Old Serbia and 1,703,866 New Serbia. In Old Serbia, 1910, 2,528,819 were rural dwellers and 382,882 were urban dwellers, 2,890,602 were Serbian citizens and 21,086 were foreigners, comprising 6,060 Turks, 6,605 subjects of Austria and 5,518 Hungarians. Serbian was the language of 2,778,706 and 32,556 could speak Serbian and Rumanian, while a few thousands spoke German, Albanian, Hungarian, Greek, Turkish, etc. In 1900, over 2,000,000 were dependent on agriculture, 166,599 on industries, 109,998 on commerce, 116,566 on public offices and the liberal professions, and 6,440 on primary production other than agriculture. Of the Jews, 2,636 spoke Serbian or other Slav language; 1,544 Spanish, 462 German, 40 Hungarian and 1,047 spoke other languages. Of the gipsies, 27,846 spoke Serbian, 4,709 Rumanian, 181 Turkish and 13,412 Gipsy. Less than 20 per cent of the population are able to read and write. Belgrade is the most populous centre with 90,890 inhabitants. Other important cities are: Nish, with a population of 24,949; Kragouyévatz, with 18,452; Leskovatz, 14,266; Pozarévatz, 13,411; Vranyé, 11,439; Pirot, 10,737. In the new territories are the cities of Monastir (Bitohj), with 59,856 inhabitants; Uskub (Skoplyé), 47,384; Prizren, with 21,244; and Novi Bazar, with 13,434 inhabitants.

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SERBIAN LANGUAGE. The Serbian is the principal of all the South Slavonic (Jugoslavonic) languages. With the Croatian and the Slovenian, which are mere dialects of the Serbian, the Serbian language belongs to the Southwestern Slavonic group characterized by its pronounced softness which is affected by the abundance of vowels and pleasant hissings, linguals, and dentals. The Serbians use the Cyrillic alphabet reformed by Vuk-Stefanovich-Karadjich and reduced to 30 letters for the 30 sounds, thus making the language ideally phonetic. Vuk's golden rule is "Write as you speak and read as it is written." The Croatians and Slovenians use the Latin alphabet with the aid of certain diacritic signs. The tonic accent falls always on the first syllable in bisyllabic words, but there is no rule for polysyllabic words. There is no definite or indefinite article. There are three genders (masculine, feminine and neuter); two numbers (singular and plural); the ancient Slavonic *dual* has been preserved only in *oči* (*ocki*, eyes) and *uši* (*ushi*, ears). Substantives are divided in five principal declensions with seven cases. The Serbian is very rich in tenses of verbs, and compound tenses of all verbs, transitive and intransitive, are made by means of the auxiliary *biti*, to be. But the wealth of verbs in Serbian consists chiefly of the various aspects of one and the same verb. These are (1) *imperative aspect*, denoting an action or state which is being performed before our eyes and lasts indefinitely, e.g., *lupati*, to knock; (2) *perfective aspect*, indicating an action which is performed at the moment when we speak or which will soon be ended, e.g., *lupiti*, to knock once for all. (This aspect is subdivided into (a) *inchoative*, indicating an action as fully begun without intimating that it has been or will be ended, e.g., *pevati*, to sing, *inchoative, zapevati*, to begin to sing; or from *plakati*, to weep, *inchoative, zaplakati* to burst in tears; (b) *terminative*, denoting an action which is terminated and after a substantial lapse of time, e.g., from *pevati* to sing, *terminative; odpevati*, to finish singing); (3) *semelfactive aspect* denoting that an action is being performed but will last only for a second or will be performed but once and may happen again only to last for another second, and so on, e.g. *lupnuti*, to knock once; (4) *iterative aspect* denoting an action which has been or is being performed more than once, i.e., in repeated customary efforts, e.g., *lupkarati*, to keep on knocking, to persist, to persevere knocking. There are three principal dialects: *štokavski* used by the Serbians, *čakavski* used by the Croatians, and *kajkavski* used by the Slovenians, deriving their appellations from the manner in which the word "what" (*što ča, kaj*) is pronounced. The *štokavski* dialect, according to Djuro Danichich and Jagich, is only the later phase of the *čakavski*, while the *kajkavski* is in a phase transitory from the Slovenian to the Croatian. Among the oldest and most characteristic monuments of the Serbian language are 'The Record of the Commercial Convention' concluded between Ban Kulin of Bosnia and a Ragusan ambassador in 1189; the 'Code (Zakonik) of the Emperor Dushan the Mighty' (1349); Stoyan Novakovich's 'Chrestomathy of Literature and Language of the Serbian and Ancient-Serbian' (Belgrade 1877).

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SERBIAN LITERATURE. The ancient history of Serbian literature, written in the old church Slavonic language and developed from the ecclesiastic books by the so-called Slav apostles Saint Cyril and his brother Methodius, comprises the epoch from the 9th century to the end of the 14th. The principal

monuments are: the manuscripts of the Miroslav Gospel from the middle of the 12th century, the Vukan Gospel beginning 13th century, the Nikol Gospel, end 14th century. The semi-ecclesiastical and the non-ecclesiastical books are written in a language slightly different from that of Saint Cyril and bear the impress of a powerful influence from Byzantium. There would belong the stories of 'Alexander of Macedonia,' 'The Trojan War,' as also some apocryphal and Bogomil writings. But of vastly greater importance for Serbian national history are the numerous lives and genealogies of the ruling princes and high church dignitaries, amongst which the 'Life of Stefan Nemanja,' written by his sons Stefan the First-Crowned King (13th century), Saint Sava and the latter's disciple Domentian, and the 'Life of Despot Stefan' (14th century) by Konstantin the "Philosopher," are undoubtedly the most noteworthy. The 'Duishanov Zakonik' (i.e., the Code of Emperor Dušan the Mighty) is an invaluable monument of Serbian mediæval jurisprudence, and has served as a model to the legislators of other Slavonic nations. The great calamity which befell the Serbian Empire in the year 1389, at the Battle of Kosovo, interrupted the free course of Serbian literature, and the prosperous republic of Dubrovnik (Ragusa) became the focus of science and art. Some enthusiastic literary historians call that epoch "Serbian Classic" or "Golden Age," but in true essence the Ragusan literature, although written in a comparatively pure Serbo-Croatian language, and more accessible to the masses of the people, is but a mere shadow of the Italian models. The earliest Ragusan poets sang partly in Latin and partly in Serbian or Italian (Marko Marulic, 1450–1528; Jerolim or Jeronim Papalic; Sisko Mencetic Vlahovic). More distinctly Serbian in type is Gjore (or Gjordje) Drzic whose short poem, 'Zaludnje Muke' (Vain Pains) is a superb specimen of false emotion in imitation of the Humanists. Hannibal Lucić with his drama 'Robinja' (Woman Slave) offers the first play of a period, or epochal character in Serbian literature; Stjepo Gučetić (1490–1550) with his satire *Derviš* (dervish); Andrea Cubranovic (1500–50) with his humoristic and delightful poem *Jedjapka* (a Gypsy-Girl); Petar Hektorovic (1550–57) with his *Ribanje* (Fishing); Nikola Naljeskovic, Marin Drzic, Dinko Ranjina and Dinko Zlatàric mark a decisive effort to emancipate Serbian literature from Italian influence as they looked to the national life, customs and traditions for their subject matter and inspiration and manifest sincere emotions, at times almost epic in type. But the prince-poet of the Serbian literature in Dalmatia is Dzivo (or Jovan) Gundulic (1588–1638) whose masterpiece 'Osman,' a long and impressive epic poem, glorifying now with virtuosity now with real poetic art, the long struggle of the Christians with the Ottoman Mohammedans (most especially the battle of 1621 between the Poles and Sultan Osman), and celebrating after the manner of a national minstrel, the triumph of the Cross over the Crescent, will remain forever one of the noblest proofs of Serbian poetic genius, and may be justly called the "Jerusalem Redeemed" of the South-Slav world. However the epic element in 'Osman' is subordinate to the chain of lyric songs which constitute the greater part of the poem and which are of an incomparable beauty. Gundulić is pre-eminently a lyric poet, lacking in true emotion but excelling in the dramatic-idyllic field. His 'Ljubovnik Sramezljev' (A Shy Lover) is a free transversification of Gisolamo Preti's, and very characteristic of the epoch. Dzono Palmotic (1606–57) exceeds all his contemporaries in dramatic art with a romantic tendency for painting at once the good and evil, the sublime and the grotesque in man. Djivo Bunic Vucicevic, author of some charming erotic songs full of genuine feeling, forms a contrast to his contemporary, Gundulic. Ingjat Djordjić (1657–1737) is the last of the chain of pseudo-classical Dalmatian writers. As a link between Dalmatian literature and the new literature of the Austrian Serbians of the senseless "Slavjano Serbskaja Skola" (Slavo-Serbian School), came Andrea Kacic-Mosic with his 'Razgovor' and his worthy attempts to collect Serbian national heroic ballads. The Slavo-Serbian School has furnished many a gifted writer, among whom Joakim Vuic, with his 'Travels Through Serbia,' Lukian Mnsicki, and more especially Jovan Raic, with his remarkable 'History of the Various Slav Peoples and particularly of the Bulgarians, Croats and Serbians,' stand high in literary history, for they paved the way to a new literary renascence. Of great importance for the development of the people at large was the literary and educational activity of Bositej Obradović (1731–1811), for he was the first who dealt a mortal blow to the literary jargon of the Slavo-Serbian school with his numerous and eagerly read works, among which his 'Autobiography' and his translations and personal interpretations of 'Esop's Fables' are masterpieces in modern Serbian literature. But the gigantic work of a Servian villager, Vuk Stefanović-Karadžić, (1787–1864), forms an important epoch in the history of Serbian thought. Amidst a violent cohort of fierce antagonists, who represented all that was literary and learned amongst a patriarchal people, Vuk stood and fought bravely for 50 years, collecting zealously from the lips of the national bards the spirited ballads and hero tales, of which he published the first volume in 1814. The work was acclaimed by the entire literary world and partly translated into German by Goethe and the brothers Grimm. From those national poems he compiled a 'Dictionary,' interpreted by German and Latin equivalents (2d enlarged ed., Vienna 1851; 3d prepared by P. Djordievic and L. Stojanovic, Belgrade 1898) which could be compared favorably to Dr. Samuel Johnson's work, with the difference that Vuk drew all his examples and citations from the lips of the people, ignoring the works of the literary and learned classes. His numerous enemies at length opened wide their arms to Vuk, for he had a whole people standing by him, and his work definitely established the spoken Serbian language as a literary means. His ingenious alphabet consists of 30 letters for the 30 sounds of the Serbian language, and there are no diphthongs or double consonants. The golden rule: "Write as you speak and speak as you write" found good expression in his grammar, which Jakob Grimm translated into German. In 1823 Vuk published at Leipzig three volumes of Serbian national poems, which

were translated into German by Talvj (2d ed., Leipzig 1853) and into English by Sir John Bowring (London 1827). His other writings brought to light the inexhaustible treasures of the Serbian national customs, proverbs, anecdotes, enigmas, charades, etc., with which even his remarkable dictionary abounds. In his work he was powerfully aided by the ruling prince of Serbia, Milos Obrenovic, by Kopitar and the famous Serbian philologist Djuro Danicic. Around Vuk in Vienna there formed a circle of young Serbian poets, among whom Branko Radicevic (1824–63) with his lyric poems, occupies the highest place among modern Serbian lyric poets. Sima Milutinović «Sarajlija» essayed himself unsuccessfully in the epic field with his 'Srbijanka,' eagerly read in its time but wholly forgotten now before the exuberance of the heroic poetry of the entire national genius such as collected by Vuk. Sarajlija's greatest merit, however, is Prince-Bishop Petar II Petrovic of Njegos (1814–51), whom he trained in the ars poetica, and whose supreme dramatic poem 'Gorski Vijenac' (The Mountain Wreath), full of philosophic reflections, in a beautiful blank decasyllabic verse, stands alone in the entire history of Serbian artistic poetry. More of virtuosity in versification than real poetry is to be found in the unduly popular Zmaj Jovan Jovanovic as opposed to the gifted and fervent poet of madscarlet style, Djura Jaksic. To characterize the two one might say that the former is unreadable and the latter is unread. Of the more modern and contemporary poets mention must be made of Lazar Kostic and Jovan Ducic. King Nickolas Petrovic of Montenegro deserves a high place with his national anthem 'Onamo onamo' ('Thither, Thither') and his drama 'The Empress of the Balkans' (English adaptation by W. M. Petrović and D. J. Volnay, London 1913). Among the modern novelists and short story writers prominently appear Stjepan Mitrow Ljubisa, Adamov, Sabcanin, Janko Veselinovic, Sima Matavulj and especially Lazar K. Lazarovic, whose short stories 'When Father took me first to Matins,' 'The People Will Gild All,' etc., contain Shakespearean dialogues, and have earned a world-wide fame. In the historic-philosophic field Djuro Danicic and his worthy student, Stojan Novakovic occupy a very high place, as does also Josif Pancic in the domain of natural science. Bogdan Poporic and his disciple, Jovan Skerlic are as subtle literary critics as are respectively Oscar Wilde and Walter Pater. Branislav Petronijevic, with his metaphysical writings, proved himself a worthy student of Professor Wundt. In the course of the latter part of the 19th and during the first decade of the 20th century many noteworthy literary and scientific magazines have been appearing, among which the *Otadžcina, Delo, Ozao, Godisnjak, Srpska Zora, Nada, Bosanska Vila, Letopis Matice Srpske, Glas Akademije Nanka, Knizevni Glasnik,* etc., compare favorably with the best publications of the kind in France, England and America.

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SERBIAN NATIONAL POETRY. Perhaps no people in the world possess such a wealth of national poetry as the Serbians. All Serbian national poetry is divided into two main groups: the heroic songs (junačke Pjesme) which are sung, or recited, to the accompaniment of the *gusle,* by men only, and the lyric or women songs which are sung by both women and men. From time immemorial the Serbian has possessed an exceptional natural gift brought from his ancient abode in the north for composing heroic ballads; and the beautiful scenery of his new surroundings in the Balkan Peninsula and the contact with the civilized Byzantine influenced it so considerably that in some of those ballads one can find a marvelous union of rough force and virility of a naive and healthy people with all the splendor and picturesqueness of the ancient Hellenic pattern. The cycle of heroic songs about the disastrous Battle of Kossovo (1389) resemble the Homeric epic rather than any product of the genius of the northern Slavs. The most ancient cycle of ballads dwells on marvelous and mythological subjects, often exhibiting, like the Edda, notions about the creation of the world and some curious reminiscence of India as if to show that that land was the prehistoric abode of the ancient Slavs. The second cycle contains mostly songs of a religious character from the early Christian era, not without a mass of phantastic legends that were furnished by the apocryphal writings. The third cycle dwells on the events of the Turkish invasion and the struggle of the Cross against the Crescent. The fourth cycle, which is still in development, deals mostly with the wars and insurrections against the Turks and other oppressors. The *guslari* (national bards or minstrels or troubadours) used to go from one village to another, from one castle to another, chanting in an easy decasyllabic blank verse the exploits of Serbian heroes, the *hajduks* (robber-knights), and of the poems on great and national events. But by far the most popular are those which glorify the deeds of the wonderful and favorite national hero, Kraljević Marko (the Royal Prince Marko) and his horse Sarac. The exuberance of romance and the music of the language of those poems offer a majestic and strange contrast to the simplicity in which the *guslar* tells his story and the modesty of the musical instrument by which he accentuates his recitation. The heroic decasyllabic lines have invariably five troches, with the fixed caesura after the second foot, and almost every line is in itself a complete sentence. The women-songs dwell mostly on Eros, but there are also many occasional songs which are sung at weddings, Christmas, Easter and numerous social gatherings (*moba, selo, prelo,* etc.). Many of those lyrics sing of birds and animals and even inanimate objects which are personified in the intense imagination of the woman poet. The vehement outburst of love and friendship manifest in some of those songs constitute a striking contrast to the hidden pain and slave-like tears with which others abound. The metre is most diverse, there being lines of from 4 to 16 syllables, but in those of 8 or more the caesura appears as a regular and constant repose. While the heroic verse, with the exception of accidental assonances, is blank, the rhyme of the lyric songs is very rich. Elision is most infrequent and inadmissible in Serbian verse; yet there are poets who in reciting, exceed all boldness. When Vuk Stefanovic Karadzio published in Vienna (1814), his first collection of Serbian national poetry which contained in one volume 200 lyric and 23 heroic songs, Jacob Grimm, after having learned Serbian and translated into German a few of the poems, exclaimed, "The Serbian national poetry deserves indeed a general attention. . . . On account of these ballads I think the Serbian will now be universally studied." Seven years later Karadzic published at Leipzig a second edition in three volumes containing 406 lyric songs and 117 heroic ballads. It was from this edition that Sir John Browning made his metrical translation of a number of those poems which he published in 1827 in London under the title 'Servian Popular Poetry.' The third edition of Karadzic's work appeared in Vienna at intervals between the years 1841 and 1866; it had now grown to five volumes. The Serbian government published later (1891) several collective editions in seven and nine volumes. Of the many attempts to render those poems in any of the foreign languages, besides that of Browning, the following deserve a special mention: von Talvj's 'Volkslieder der Serben' (in verse, Leipzig 1853); Dozon, A., 'L'Epopé Serbe' (in prose, Paris 1888).

Bibliography.— Kapper, S., 'Die Gesenge der Serben' (Leipzig 1858); Pypin, 'Istoriya Slavyanskih Literatur' (Petrograd 1879); Karadric, V. S., 'Srpske Narodne Pjesme' (Belgrade 1891); Stepović, 'Ocherki istorii serbohorvatskoy literaturi' (Kief 1899); Boskovic, S., 'Bacvanske Pesme' (Novi Sad 1863); Radicevic, 'Gusle Crnogorske' (Belgrade 1872); Filipovic, 'Kraljevic Marko u narodnih pesmah' (Zagreb 1880 and 1891); Hormann, 'Narodne Pjesme Muhamsdanaca u Bosni i Hercegovini' (Sarajevo 1880 and 1889).

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SERENADE, properly, music performed in a clear night; hence a musical entertainment provided by a lover under the window of his mistress. It consists generally of instrumental music, but vocal is sometimes added. The practice existed even among the Greeks and Romans. Such music is sometimes performed merely as a mark of esteem and good-will toward distinguished persons, and then is not infrequently accompanied by long processions with torches. Hence the different character of serenades. A single singer may accompany his song with the guitar, mandolin, lute, etc.; or wind-instruments may be used, as flutes, horns, clarinets, hautboys; or, as is the fashion in some of the largest cities in northern Germany, many singers may join. Serenades are also sometimes used as concert-pieces, and then, of course, experience some change of character.

SERFS, the body of laborers, the working classes in general under the feudal system in Europe, and whose condition, though not exactly that of slaves, was little removed from it. Under this system, from the vassals of the king downward, the whole community was subject to certain degrees of servitude, and it was only on condition of specific services to be rendered to his superior that any individual held his fief. In the case of the lower classes this servitude amounted to an almost complete surrender of their personal liberty. There were two classes of laborers, the villeins and the serfs proper. The former occupied a middle position between the serfs and the freemen. Hallam remarks, in reference to these two classes, that in England, at least from the reign of Henry II, one only, and that the inferior, existed; incapable of property and destitute of redress except against the most outrageous injuries. A serf could not be sold, but could be transferred along with the property to which he was attached. The revival of the custom of manumission counteracted the rapid increase of serfs. A serf could also obtain his freedom by purchase, or by residing for a year and a day in a borough, or by military service, or by dying. By these various means the serf population gradually decreased. In most parts of the Continent they had disappeared by the 15th century. The extinction of serfdom in England and Scotland was very gradual. As late as 1574 Elizabeth issued a commission of inquiry into the lands and goods of her bondsmen and bondswomen in specified counties in order to compound for their manumission; and even in the 18th century a species of serfdom existed among Scottish miners. Serfdom in Russia was abolished by a manifesto of Alexander II on 17 March 1861. Consult Page, T. W., 'End of Villainage in England' (New York 1900); Vinogradoff, Paul, 'Growth of the Manor' (New York 1911); Mavor, James, 'Economic History of Russia' (New York 1915). See Feudal System.

SERGE, a kind of twilled worsted cloth, used for ladies' dresses, gentlemen's summer suits, etc. Navy serge is a thick durable make of this cloth.

SERGEANT, Army, an inferior or non-commissioned officer in a company of infantry appointed to see discipline observed, to teach the soldiers the exercise of their arms, and to order, straighten, and form ranks, files, etc. He also commands small bodies of men, as escorts and the like. He ranks next above the corporal, and is usually chosen from the steadiest of the corporals. There are four sergeants in a company, and of these the senior is called color-sergeant. Staff-sergeants are higher than these, and the highest sergeant of all is the sergeant-major.

SERGIPE, sĕr-zhē'pĕ, or **SERGIPE-DEL-REY,** Brazil, a state on the Atlantic Coast; area, 15,090 square miles. The coast is flat and sandy; the interior consists of wooded hills. Streams in the populated eastern portion are numerous, but on the west are few. The chief river is the São Francisco; besides the Vasa-Barris or Irapiranza. The flora on the slopes of the Serra de Itabaiana is rich in valuable cabinet and dyewoods; iron-ore and crystal quartz occur. Although the soil is not very productive, sugar-cane, cacao, cotton, tobacco, corn, rice and flax are grown. On the Campos de Criaçao de Gados stock-raising is profitable. The industries include sugar refineries, distilleries, flour-mills and tanneries; shipbuilding on a small scale is carried on. Sugar and cotton are the principal exports. Capital, Aracajú. Pop. about 426,250.

SERGIUS, sĕr'jĭ-ŭs, the name of four popes, as follows:

SERGIUS, I: b. Syria, about 630; d. Rome 701. He succeeded Conon in 687. He opposed several provisions of the Quinisext Council of Constantinople in 692 and in consequence Justinian II sent to arrest him. Sergius, however, was protected by the exarch of Ravenna. He died in Rome after a pontificate of nearly 14 years.

SERGIUS II: b. Rome; d. 847. He succeeded Gregory IV in 844, and during his pontificate the Saracens from Africa ascended the Tiber, and plundered the environs of Rome.

SERGIUS III: d. 911. He was raised to the papal chair in 904, after the anti-pope Christopher had been expelled. On the strength of Luitprand's testimony, his character has been deeply calumniated. But contemporary chroniclers speak of him in the highest terms as a pious and enlightened pope. He restored the Lateran Church, and filled the Holy See nearly seven years.

SERGIUS IV: d. 1012. He succeeded John XIX, in 1009, and during his pontificate, and as a result of his exhortations, the Italian princes united to drive out the Saracens from the country. It was in his time also that the Normans began to enter Italy.

SERI (sā-rē') **INDIANS** (Opata, "spry"), an exceedingly primitive tribe of North American Indians, speaking a distinct language and living on Tiburon Island, in the Gulf of California, and the adjacent mainland of Sonora, Mexico. Although known since 1540, when some of Coronado's men visited them, almost nothing was known of their character, save that they were warlike and extremely conservative, until Dr. W. J. McGee led a small expedition among them, in the interests of science in 1894 and again in 1895. The Seris are unusually tall and well-built; they wear little clothing and subsist chiefly on turtles, water-fowl, fish and other food of the sea, eked out with the vegetal and animal products of the mainland desert. Their houses are flimsy bowers of cactus and shrubbery, sometimes rudely shingled with turtle shells and sponges. Bows and arrows are habitually used as weapons, harpoons of cane are employed for taking turtles, and unworked bowlders or cobbles form a ready means for serving meat, crushing bones, mulling seeds, etc. They make graceful balsas of canes lashed together for use in navigating the strait between their island and the mainland; manufacture a very light pottery and some basketry. Shells are used for cups and to some extent for implements. The modern Seris are loosely organized in a number of maternal groups or clans, which are notable for the prominence given to mother-right in marriage and for some other customs. Polygamy prevails. These savages manifest an implacable hatred toward aliens, whether Caucasian or Indian, and the shedding of alien blood is regarded as their highest virtue. Two centuries ago the population of the tribe was estimated at several thousands, but it has been reduced by almost constant warfare, so that now it is barely 350. Consult McGee, 'The Seri Indians'; 17th Report of the Bureau of American Ethnology, Washington, D. C.

SERICULTURE. See SILK AND SILK INDUSTRY.

SERIES. A series is a succession of numbers or *terms*, usually proceeding according to some definite law. The law of the series may either define how a given term is derived from those that precede it, or it may define a term as a function of the number denoting the position which it occupies in the series. Thus, the series 1, 2, 3, 5, 8, 13, . . . is such that each term after the first two is obtained by adding together the two terms immediately preceding it, and the law of the series might be expressed by the formula $u_{n+1} = u_{n-1} + u_n$, in which u_{n-1}, u_n, u_{n+1} are any three consecutive terms. On the other hand, the series $1, \frac{2}{3}, \frac{3}{5}, \frac{4}{7}, \ldots$ may be defined by the law that the nth term of the series is $\frac{n}{2n-1}$. Each term is then a function of the number n which determines its position in the series. One and the same series may frequently be defined in both ways. Thus, the series, $1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \ldots$ is such that each term may be obtained from the preceding one by multiplying it by $\frac{1}{2}$. It may also be defined by the formula $\frac{1}{2^{n-1}}$ as the expression for the nth term. A series is not uniquely determined when a number of its terms are given. In fact, an infinity of series may be found which include as terms any finite number of arbitrarily assigned numbers. In such a case the simplest law that can be found is naturally to be taken as *the law* of the series. Important use is made of this principle in the physical sciences. Series of numbers frequently arise in connection with experimental observations, which evidently proceed according to some definite law, and it is often of great interest to determine the nature of the law. Such series occur, for example, in the theory of spectrum analysis. Balmer's formula $c\frac{n^2}{n^2-4}$, in which c is a certain constant, determines, for different integer values of n, the wave-lengths of a long series of lines in the hydrogen spectrum. A variety of formulas have been obtained for other spectra. A very instructive account of the methods used in determining such series is given in Kayser's 'Handbuch der Spectroscopie,' Vol. II, pp. 503–573.

A series is said to be *finite* or *infinite* according as the number of its terms is limited or unlimited.

Finite Series.

The law of the series being given, the most important problems relating to a finite series are the determination of the term occupying a given position and finding the sum of the series. The following cases are those of chief interest.

Arithmetic Series.— This series is $a, a+d, a+2d, \ldots, l$, so that the difference between any two consecutive terms is constant and equal to d. The nth term l is evidently obtained by adding d $n-1$ times to a and hence $l = a + (n-1)d$. If S denote the sum of the series, then $S = a + (a+d) + (a+2d) + \ldots + l$. By writing the terms in reverse order, the sum may also be expressed in the form

$$S = l + (l-d) + (l-2d) + \ldots + a.$$

The addition of these two equations gives $2S = (a+l) + (a+l) + \ldots$ to n terms, whence $S = \frac{1}{2}n(a+l) = \frac{1}{2}n[a + (n-1)d]$. In particular the sum of the first n integers 1, 2, 3, . . ., n is $\frac{1}{2}n(n+1)$, and the sum of the odd integers 1, 3, 5, . . ., $2n-1$ is n^2.

Higher Arithmetic Series.—The general expression $a + (n-1)d$ for the nth term of an arithmetic series is an integral function of the first degree in n. A more general series may be formed in which the expression for the nth term is an integral function of degree s in the n. Such a series is called a *higher arithmetic* series of order s. Let $a_1, a_2, a_3, \ldots$ represent the series. A new series $b_1, b_2, b_3, \ldots$ is formed from this by taking the differences of consecutive terms, so that $b_1 = a_2 - a_1$, $b_2 = a_3 - a_2$, etc. This is called the series of first differences. Let a series $c_1, c_2, \ldots$ be formed from $b_1, b_2, \ldots$ in like manner. These are the second differences. Let $d_1, e_1, \ldots$ be the first terms in the series of third, fourth, . . . differences respectively. Since a_n is a polynomial of degree s in n and a_{n+1} is the same polynomial in $(n+1)$, it follows that b_n, which equals $a_{n+1} - a_n$, is of degree $s-1$ in n; and, finally, that the nth term of the series of $(s-1)$th differences is of degree one in n; that is, the last series of differences is a simple arithmetic series. The series of sth powers of the natural number $1, 2^s, 3^s, \ldots, n^s$ is the simplest example of a higher arithmetic series of order s.

The nth term of the series $a_1, a_2, a_3 \ldots$ can readily be expressed in terms of $n, b_1, c_1, \ldots$ namely,

$$a_n = a_1 + (n-1)b_1 + \frac{(n-1)(n-2)}{1\cdot 2}c_1 + \frac{(n-1)(n-2)(n-3)}{1\cdot 2\cdot 3}d_1 + \ldots,$$

the last term of the formula being of degree s in n. With fractional values of n this formula is much used for the purpose of interpolating between the terms of a given series numbers which shall follow the same general law of variation. For example, suppose it be required to find log 91.43, given log 91 = 1.9590414, log 92 = 1.9637878, log 93 = 1.9684829, log 94 = 1.9731279. The required number is intermediate between log 91 and log 92, which are the first and second terms of the series having log $(90+n)$ for its nth term. As the number 91.43 corresponds to $n = 1.43$, the value of log 91.43 may be calculated approximately by assuming that for a small number of terms the series of logarithms coincides very nearly with a higher arithmetic series of order s, the closeness of the approximation increasing with higher values of s. The first terms of the successive series of differences are $b_1 = .0047464$, $c_1 = -.0000513$, $d_1 = .0000012$, etc. First try $s = 1$, that is, use only two terms of the formula for a_n. This gives log $91.43 = 1.9590414 + .43(.0047464) = 1.9610824$, which is correct to only five decimals. With $s = 2$, log $91.43 = 1.9610886$, which is less than the true value by one unit in the seventh place of decimals. With $s = 3$, that is, by using four terms of the formula for a_n, the value is obtained correctly to seven decimal places.

Geometric Series.— This is composed of the terms, $a, ax, ax^2, ax^3, \ldots$ Each term is formed from the one preceding by multiplying it by x, so that the nth term is ax^{n-1}. If S denote the sum of n terms of the series, then

$$S = a + ax + ax^2 + \ldots + ax^{n-1}.$$

The multiplication of this expression by x gives $xS = ax + ax^2 + ax^3 + \ldots + ax^n$, whence, by subtracting from the preceding, $(1-x)S = a - ax^n$, and accordingly $S = \frac{a(1-x^n)}{1-x}$

Recurring Series.—A more general form of series is the *arithmetico-geometric* series, in which the nth term is of the form $(a+bn)x^{n-1}$ It reduces to the arithmetic series when $x = 1$, and to the geometric series when $b = 0$. This in turn is a special case of a *recurring* series, which is defined as follows: Let $a_1, a_2x, a_3x^2, \ldots, a_nx^{n-1}$ be the terms of such a series. If $r+1$ successive coefficients a_i are connected by a homogeneous linear relation of the form $a_n + p_1a_{n-1} + p_2a_{n-2} + \ldots + p_ra_{n-r} = 0$, in which $p_1, p_2, \ldots, p_r$ are given numbers and $n > r$, the series is called a *recurring series of order r*. The sum of n terms of a recurring series can always be found. The result is a rational fraction in x. The method of summation may be illustrated by the series of order 2. The defining relation is

$$a_n + p_1a_{n-1} + p_2a_{n-2} = 0.$$

Let $S = a_1 + a_2x + a_3x^2 + \ldots + a_nx^{n-1}$. Multiply by $1 + p_1x + p_2x^2$. This gives

$$(1 + p_1x + p_2x^2)S = a_1 + (a_2 + p_1a_1)x + (a_3 + p_1a_2 + p_2a_1)x^2 + (a_4 + p_1a_3 + p_2a_2)x^3 + \ldots + (a_n + p_1a_{n-1} + p_2a_{n-2})x^{n-1} + (a_np_1 + a_{n-1}p_2)x^n + a_np_2x^{n+1}.$$

Since $a_3 + p_1a_{3-1} + p_2a_{3-2} = 0$, the above expression reduces to

$$a_1 + (a_2 + p_1a_1)x + (a_np_1 + a_{n-1}p_2)x^n + a_np_2x^{n+1},$$

and hence

$$S = \frac{a_1 + (a_2 + p_1a_1)x + (a_np_1 + a_{n-1}p_2)x^n + a_np_2x^{n+1}}{1 + p_1x + p_2x^2}.$$

The Harmonic Series is $\frac{1}{a}, \frac{1}{a+d}, \frac{1}{a+2d}, \ldots,$ its terms being the reciprocals of the terms of an arithmetic series. The nth term is accordingly $\frac{1}{a+(n-1)d}$. The series is so named because the harmonic tones of a fundamental musical note are produced by the divisions of a vibrating string (or column of air in a tube) into lengths, which form a harmonic series. No formula exists for the sum of n terms of a harmonic series.

Infinite Series.

Convergent Series.—Let $u_1, u_2, \ldots, u_n, \ldots$, be the terms of an infinite series, and let S_n denote the sum of the first n terms. If S_n approaches a definite, finite limit as n increases to infinity, the given series is said to be *convergent*. If, on the other hand, S_n increases without limit, the series is *divergent*. If S_n does not approach any limit, the series is called indeterminate, as in the case of the series $1-1+1-1+1-\ldots$, for which, S_n takes the values 1 and 0 alternately as n increases. To illustrate these definitions, consider the infinite geometric series $a + ax + ax^2 + \ldots + ax^{n-1} + \ldots$ By the formula given above for the sum of a geometric series $S_n = \frac{a(1-x^n)}{1-x}$. If x is numerically less than unity, x^n diminishes to zero as n increases to infinity, and hence S_n approaches $\frac{a}{1-x}$ as a limit. This expression

is called the *generating function* of the series. The series and its generating function are equal for all values of x for which the series is convergent, that is, for values of x numerically less than 1. But if x is numerically greater than 1, S_n approaches infinity as n increases without limit. The series is then divergent and is no longer equal to the generating function. Similarly, with a recurring series, if its terms approach zero as a limit with increasing n, the terms $a_n x^n$, $a_{n-1}x^n$, $a_n x^{n+1}$ in the above formula for the sum of n terms of a series of order 2 approach zero and hence S_n has for limit $S=\frac{a_1+(a_2+p_1a_1)x}{1+p_1x+p_2x^2}$. A like result holds for a recurring series of any order.

A series can represent its generating function only for such values of the variable (or variables) on which it depends as will make it convergent, and hence the question of the convergence of a series is of paramount importance. Suppose at first that the terms of the series are positive. Then, if the ratio $u_{n+1}:u_n$ becomes and remains less than a proper fraction k as n increases without limit, the series $u_1+u_2+\ldots+u_n+\ldots$ is convergent. For in that case $u_{n+1}<ku_n$, $u_{n+2}<ku_{n+1}<k^2u_n$, $u_{n+3}<ku_{n+2}<k^3u_n$, and so on. Hence $u_n+u_{n+1}+u_{n+2}+u_{n+3}+\ldots<u_n(1+k+k^2+k^3+\ldots)$. But as k is a positive number less than 1, the infinite geometric series $1+k+k^2+\ldots$ is convergent and equals $\frac{1}{1-k}$. Accordingly $u_n+u_{n+1}+\ldots$ which is less than the finite quantity $\frac{u_n}{1-k}$, is a convergent series. If to this portion of the series the finite sum $u_1+u_2+\ldots+u_{n-1}$ be added, the result is finite and the given series is, therefore, convergent. While the condition just given is sufficient to ensure the convergence of a series it is not necessary. Thus, if a and b are such that $0<a<b<1$, then the series $a+b^2+a^3+b^4+a^5+\ldots$ is convergent, since it consists of the sum of the two convergent geometric series $a+a^3+\ldots$ and $b^2+b^4+\ldots$. But $u_{n+1}:u_n$ alternates between large and small values as n increases and does not, therefore, remain less than a proper fraction.

If some of the terms of a given series are negative, the series is convergent provided that the series obtained by changing the signs of all the negative terms is convergent. For example, the series $1-k+k^2-k^3+k^4-\ldots$, in which k is a positive number, is less than the series $1+k+k^2+k^3+\ldots$ and is, therefore, convergent if $k<1$. It follows from the preceding considerations that any series is convergent if the ratio $u_{n+1}:u_n$ has a limit numerically less than 1 as n increases to infinity. Thus, for the logarithmic series $\log(1+x)=x-\frac{1}{2}x^2+\frac{1}{3}x^3-\ldots\pm\frac{x^n}{n}\mp\frac{x^{n+1}}{n+1}\ldots$ the numerical value of $u_{n+1}:u_n$ is the same as that of $\frac{x^{n+1}}{n+1}:\frac{x^n}{n}=\frac{n}{n+1}x$. The limit as n increases to infinity is x. The series will accordingly be convergent if x is numerically less than 1. For the exponential series

$$e^x=1+x+\frac{x^2}{2!}+\frac{x^3}{3!}+\ldots+\frac{x^n}{n!}+\ldots,$$

$$u_{n+1}:u_n=\frac{x^n}{n!}:\frac{x^{n-1}}{(n-1)!}=\frac{x}{n}.$$

For any finite value of x this ratio becomes and remains a proper fraction as soon as n exceeds x in absolute value. Hence the series is convergent for all finite values of x.

A series of positive and negative terms is said to be *absolutely* convergent if the series obtained by making all of the terms positive is convergent. When the second series is divergent it sometimes happens that the first series is convergent, in which case it is called *conditionally* convergent, because the value of the sum is conditioned on the arrangement of the terms. For example, the logarithmic series is absolutely convergent for all values of x numerically less than 1. If $x=1$, it becomes $1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+\frac{1}{5}-\ldots$, which is convergent and equals $\log 2$. But the series $1+\frac{1}{2}+\frac{1}{3}+\ldots$ obtained by making all the terms positive is divergent. A conditionally convergent series has the peculiar property that by changing the sequence of the terms the sum of n terms may be made to approach any desired limit as n increases to infinity, as may be exemplified by the preceding series. For let c be any number. Select in order as many of the positive terms of $1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+\ldots$ as will be sufficient to make a sum greater than c. Then select just enough negative terms so that when added to these the sum shall become less than c. Then add more positive terms until the sum becomes greater than c, and so continue. This process is possible, since the positive or the negative terms alone form a diverging series. With such an arrangement of terms the sum may be made to approach as near to c as desired.

Uses of Series.— Series are of the utmost value as affording a means for the expression of any given function. In particular, functions which are defined as solutions of differential equations are most frequently not expressible in any other form. In the theory of functions as developed by Weierstrass the convergent power-series is made the fundamental instrument of investigation, and from the properties of its defining series the nature of a function is determined. (See COMPLEX VARIABLE, THEORY OF FUNCTIONS OF). The expression of a function in the form of a series is of especial importance when it is desired to calculate its numerical value. It is by this means that various numerical tables, such as the logarithmic and trigonometric, are calculated.

Taylor's series: $f(x)=f(a)+f'(a)(x-a)+\frac{1}{2!}f''(a)(x-a)^2+\ldots+\frac{1}{n!}f^{(n)}(a)(x-a)^n+\ldots$ is the formula most generally useful for the purpose of expanding any given function $f(x)$ in ascending powers of $x-a$, a being a given constant so chosen that the functions and its derivatives $f'(x)$, $f''(x)$, $\ldots$, $f^{(n)}(x)$, $\ldots$ are finite and continuous for values of x sufficiently near to a. Another form for Taylor's series, and the one to which the name is more frequently applied, is obtained by writing h in the place of $x-a$ so that $x=a+h$. The above equation then takes the form

$$f(a+h)=f(a)+f'(a)h+\frac{1}{2!}f''(a)h^2+\ldots+\frac{1}{n!}f^{(n)}(a)h^n+\ldots$$

This series is convergent, if h is not too large. *Maclaurin's series* for the expansion of a function of x in ascending powers of x is obtained as a special case of the first form of Taylor's series by putting $a=0$. The formula is of course inapplicable if the given function or any of its derivatives are not finite when $x=0$.

For the purposes of numerical calculation it is essential to know how close an approximation to the true value of the function may be obtained by using a given number of terms in Taylor's series and discarding the rest. If S_n denote the sum of the first n terms of the series and R_n the remainder of the series, then $f(x)=S_n+R_n$ and the amount of error introduced by using S_n as the approximate value of $f(x)$ is equal to the remainder R_n. An expression for the remainder in Taylor's series (second equation) was obtained by Lagrange in the form $R_n=\frac{1}{n!}f^{(n)}(a+\theta h)h^n$, in which θ denotes a certain number between 0 and 1. To illustrate, the formula for $\sin(a+h)$ expressed in terms of Lagrange's remainder is

$$\sin(a+h)=\sin a+\cos a\cdot h-\tfrac{1}{2}\sin a\cdot h^2-\frac{1}{3!}\cos a\cdot h^2+\ldots+\frac{1}{n!}\sin\left(a+n\frac{\pi}{2}+\theta h\right)h^n.$$

Since $\sin x$ does not exceed 1 in numerical value the error in discarding the remainder of the series after n terms is not numerically greater than $\frac{h^n}{n!}$. If, for example, knowing $\sin 45^\circ=\cos 45^\circ=\frac{1}{\sqrt{2}}$, it is desired to calculate $\sin x$ for succeeding angles at intervals of 1″, the value for h is taken to be .0000048481, which is the radian measure for 1″ in degree measure. Two terms of the preceding formula give the value of sin 45° 1″ correct to 10 decimals. For the remainder is $R_2=\frac{-\sin\left(\frac{\pi}{4}+\theta h\right)}{2}\cdot h^2$, the first factor of which differs slightly from $-\frac{1}{2\sqrt{2}}$, while h^2 has no significant figure before the eleventh decimal place.

The cases in which Lagrange's formula is practicable for determining the limit of error are comparatively few in number. A convenient limit of error may frequently be found by comparing the given series with a simpler one of less rapid convergence, the limit of error for which can be determined. In particular, a series $u_1-u_2+u_3-u_4+\ldots$ of alternately positive and negative terms which are numerically decreasing toward zero as a limit is convergent, and the error in taking only n terms is less than the next succeeding term u_{n+1}, but greater than $u_{n+1}-u_{n+2}$. For the series may be written $(u_1-u_2)+(u_3-u_4)+\ldots$, which is a sum of positive terms and, therefore, increases, with the number of terms, toward a finite limit, or becomes indefinitely large. But the series may also be written $u_1-(u_2-u_3)-(u_4-u_5)-\ldots$, in which all the terms after the first are negative and hence the sum is less than u_1. The numerical value of R_n is $u_{n+1}-u_{n+2}+u_{n+3}-\ldots$, which, by a repetition of the preceding argument, is greater than $u_{n+1}-u_{n+2}$ and less than u_{n+1}. Thus, for the logarithmic series mentioned above, the error in stopping with the nth term is less than $\frac{x^{n+1}}{n+1}$ (if x is positive). For $x=\frac{1}{10}$ the value of $\log(1+x)$ is given by S_n correct to at least $(n+1)$ decimal places. For values of x near 1 the series converges very slowly. A more rapidly converging series can be obtained by changing x into $-x$, which gives

$$\log(1-x)=-x-\tfrac{1}{2}x^2-\tfrac{1}{3}x^3-\ldots,$$

whence, by subtracting the series for $\log(1+x)$,

$$\log\frac{1+x}{1-x}=2(x+\tfrac{1}{3}x^3+\tfrac{1}{5}x^5+\ldots).$$

In this x is replaced by $\frac{1}{2z+1}$, from which follows

$$\log\frac{z+1}{z}=\log(z+1)-\log z=2\left[\frac{1}{2z+1}+\frac{1}{3(2z+1)^3}+\ldots\right].$$

This series is convergent for all positive values of z. The remainder after n terms is

$$2\left[\frac{1}{(2n+1)(2z+1)^{2n+1}}+\frac{1}{(2n+3)(2z+1)^{2n+3}}+\ldots\right]$$

which is evidently less than the geometric series

$$\frac{2}{(2n+1)(2z+1)^{2n+1}}\left[1+\frac{1}{(2z+1)^2}+\frac{1}{(2z+1)^4}+\ldots\right]$$

the sum of which is $\frac{1}{2(2n+1)(2z+1)^{2n+1}(z^2+z)}$. The error in neglecting R_n is accordingly less than the value of this expression.

The importance for numerical computation of having a series of sufficiently rapid convergence is illustrated by the formula for π. Gregory's series is $\frac{1}{4}\pi=1-\frac{1}{3}+\frac{1}{5}-\frac{1}{7}+\ldots$ which converges so slowly that according to Newton it would require 5,000,000,000 terms and 1,000 years' time to calculate the value of π to 20 decimals. On the other hand, by means of Machin's formula, which converges very rapidly, Shanks has computed the value of π to 707 decimal places.

Divergent Series.— It was supposed by the earlier mathematicians that divergent series were entirely useless. There is, however, a class of such series that have been found not only useful but necessary for the purposes of approximate computation. These have been employed for a long time by astronomers even after their divergence had been proved, their use being justified by the close agreement between calculation and observation. The series in question have the property that the terms at first decrease in numerical value until a certain minimum term is reached, after which they increase without limit. The series is converging as far as its minimum term, beyond which it is diverging. The converging portion of the series frequently affords a very good approximation to the value of the given function. The series for the probability integral $\int_0^x e^{-t^2}dt$ is an example of this kind. By expanding e^{-t^2} in powers of t^2 and integrating term by term, this function is expressed by means of the series $x-\frac{1}{3}x^3+\frac{1}{5\cdot 2!}x^5-\frac{1}{7\cdot 3!}x^7+\ldots$, which is convergent for all finite values of x. For large values of x the convergence is too slow for practical purposes and the series

$$\frac{\sqrt{\pi}}{2}-\frac{e^{-x^2}}{2x}\left[1-\frac{1}{2x^2}+\frac{1\cdot 3}{2^2\cdot x^4}-\frac{1\cdot 3\cdot 5}{2^3\cdot x^6}+\ldots\right]$$

is used instead. While this series is divergent

beyond a certain term, the sum of the converging portion gives an approximation having an error less than the numerical value of the last term used. This approximation is so good and the convergence so rapid that for values of x as small as 3 this series is more convenient to use than the first one and gives a value correct to eight decimals, the first 11 terms being convergent, while for $x = 10$ the first 100 terms are convergent and give a value which is correct to at least 110 decimal places.

The theory of divergent series has recently been receiving considerable attention, chiefly from the French mathematicians. In particular, the problem of determining in how far the divergent series may validly be used as a purely formal representation of a function has been studied by Poincaré, who has developed some important and far-reaching results. An interesting account of the present state of the subject is given by Borel in his 'Leçons sur les séries divergentes' (Paris 1901).

Series of Functions; Multiple Series.— It is often important to express a function as a series the terms of which are given functions such as trigonometric or Bessel functions. Such series are of great service in mathematical physics, especially the *Fourier series* of sines and cosines of multiple angles, which is much used for representing functions having a periodic character. This series was first employed for that purpose by Fourier (1822) in his 'Théorie analytique de chaleur.'

In a simple series $u_1, u_2, \ldots$ the general term u_n is a function of a single integer n defining its position in the series. A *double series* is one in which the general term $u_{m,n}$ is a function of two independent integers m, n. A *multiple series* is one in which the general term is a function of several integers $m, n, p, \ldots$. Such series are of fundamental importance in the study of various classes of functions such as the elliptic functions and the multiple theta functions.

History and Literature.— Some of the properties of arithmetic and geometric series were known in very ancient times, as the oldest manuscript in existence, the Rhind papyrus, which is believed to be a copy of a work dating back 3,000 or more years before Christ, gives an account of some problems which are solved by means of these series. There is considerable ground for supposing that the general formula for the sum of an arithmetic series was known at that time, although it does not occur explicitly in mathematical literature until the time of Archimedes (287–212 B.C.). The formula for the sum of a geometric series was known to the Greeks as it is given by Euclid (about 300 B.C.), while the summation of the infinite series $1 + \frac{1}{2} + (\frac{1}{2})^2 + (\frac{1}{2})^3 + \ldots$ was effected by Archimedes. The general expression for the sum of an infinite geometric series was first given by Vieta (1540–1603 A.D.). A formula for the sum of the squares of the positive integers was given by Archimedes, and for their cubes by Nikomachus (about 100 A.D.). Except for these two particular cases no knowledge of the summation of higher arithmetic series is apparent before the 16th century. The subject as we now know it was developed chiefly in the following century and it took its present form in the 'Ars conjectandi' of Jacob Bernoulli (1713). The name "arithmetic series of higher order" was given by Leibnitz. Newton was the first to recognize the importance of infinite series as an instrument of mathematical investigation. His results were published in 1669 (not printed until 1704) in a work entitled 'Analysis per Aequationes Numero Terminorum Infinitas.' A systematic treatment of series was given by Euler in his 'Introductio in analysin infinitorum' (1748). The principle that an infinite series cannot be safely employed unless it is convergent was first given in this work. Gauss (1813) inaugurated the modern epoch in the theory of infinite series in his memoir, 'Disquisitiones generales circa seriem infinitam, $1 + \frac{a \cdot b}{1 \cdot c} x + \frac{a(a+1) \cdot b(b+1)}{1 \cdot 2 \cdot c \cdot (c+1)} x^2 + \ldots$' He insisted on rigorous tests for convergence and was first to give definite criteria for convergence and divergence. In the 'Cours d'analyse de l'Ecole Polytechnique' (Paris 1821), Cauchy extended the theory of power-series to the expansion of functions of a complex variable and gave the important theorem that a series is convergent if the limit of $u\sqrt[n]{n}$ is numerically less than 1 when n increases to infinity. Further contributions, including additional criteria for convergence and a development of the principle of continuity of series, were made by Abel (1826) in his 'Recherches sur la série,

$$1 + \frac{m}{1} x + \frac{m(m-1)}{1 \cdot 2} x^2 + \ldots$$

('Œuvres complètes,' Vol. I, p. 223). This celebrated memoir is a model of scientific accuracy and comprehensiveness, and exerted an important influence on the growing spirit of rigorous and critical investigation.

Among modern works on series the following may be mentioned: Chrystal's 'Algebra' (Edinburgh 1886), chaps. xx, xxvi–xxxi; Osgood's 'Introduction to infinite series' (Harvard University Publications 1897); Godefroy's 'Théorie élémentaire des séries' (Paris 1903); Runge's 'Theorie und Praxis der Reihen' (Leipzig 1904); Borel's 'Leçons sur les séries à termes positifs' (Paris 1902); Hadamard's 'La série de Taylor' (Paris 1901); Jordan's 'Cours d'analyse' (Paris 1893), Vol. I, chap. iii; 'Encyclopädie der Mathematischen Wissenschaften' (Leipzig 1898–1904), Vol. I, part 1, pp. 47–146.

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SERIES, the term applied to the rocks laid down during an epoch. Thus we speak of the Acadian series as laid down in the Acadian epoch. Series is a subdivision of system (q.v.) just as epoch is a subdivision of period (q.v.).

SERIES-PARALLEL CONTROLLER. See ELECTRICAL TERMS.

SERIN, *in ornithology,* a finch, *Serinus hortulanus,* which is closely allied to the canary. The bird's mantle and back are of a dark-grayish brown, each feather being edged with a broad strip of yellow. Its head is olive-gray and the throat and breast are of a bright gamboge-yellow, shading to white on the belly. It is four and one-half inches long. The serin-finch is noted as a lively and indefatigable singer. It is migratory and spends the summer and oftentimes the winter in Middle Europe.

SERINGAPATAM, sĕr-ĭng-ga-pa-tăm' (properly, Sri-ranga-patanam, "city of Vishnu"), India, a celebrated town and fortress, the former capital of Mysore, 245 miles west by south from Madras, on an island formed by two branches of the Kaveri. The fort, a massive structure, stands on the western end of the island and contains within its walls the ruins of the palace of Tippu Saib (q.v.), a mosque built by the same ruler and an old temple. Just outside of the fort is Tippu's graceful summer palace, now in ruins. At the east end of the island, near the suburb of Ganjam, where almost all the inhabitants now reside, is the mausoleum in which Tippu and his father, Hyder Ali, are buried. The fort was three times besieged by the British, first in 1791 and afterward in 1792 and 1799. On the last occasion the fortress was carried by assault, Tippu being slain. The town once contained about 150,000 persons, but its population in course of time has steadily decreased until now it is only about 12,500.

SERINUS, *in ornithology,* a genus of the sparrow family *Pringillidæ* (q.v.), having a stout cone-shaped bill, broad at the base; the nostrils basal, round and hidden by stiff frontal feathers directed forward, gape straight, without bristles. The serinus is small, compact and active; the legs are short and scutelate; the feet strong; the wings which are moderately long and somewhat pointed have a minute outer primary; and the tail is deeply forked. The serin (q.v.), *Serinus hortulanus,* the *S. canonicus,* the *S. canarius,* the canary, and *S. pusillus,* the red-fronted finch, are inhabitants of the Western Palæarctic regions, but some species are to be found in the Eastern Palæarctic, Oriental and Ethiopian regions.

SERIOLA, *in ichthyology,* a genus of *Carangidæ,* divided into 12 species and inhabiting temperate and tropical waters. The body is oblong and slightly compressed, and the abdomen is rounded; the first dorsal fin is continuous, with feeble spine; villiform teeth in jaws and on the vomer and palatine jaws. The smaller species are valueless, but the larger species which range from four to five feet in length are used as food.

SERIPHOS, sĕ-rī'fŏs, or **SERPHO** (now SERPHOS), Greece, a mountainous island of the Cyclades group, 50 miles south of Eubœa. It contains iron, copper and lead ore — formerly exploited. The products are chiefly corn and wine. The ancient town participated in the battle of Salamis, furnishing the Athenians with several ships. Seriphos was also a place of exile for the Romans. Pop. 4,000.

SERLIO, sär'lē-ō, **Sebastian,** Italian artist: b. Bologna, 6 Sept. 1473; d. Fontainebleau, 1554. He worked as painter and architect at Pesaro for 14 years, leaving that city (1514) for Rome and Venice, where he became Titian's associate. He published at Venice in 1537 his voluminous treatise 'Regole Generale d'Architectura.' He is supposed to have worked with Pierre Lescot on the Louvre. Primaticcio in 1541 was appointed architect at Fontainebleau with Serlio as assistant.

SERNA Y HINOJOSA (lä-sär'nä ē ēn-ō-hō-sä), **José de la,** famous Spanish general: b. Jerez de la Frontera, 1770; d. Cadiz, 1832. He fought in the Peninsular War against the French and served under Wellington in 1813. After working his way up from the ranks to the position of major-general, in 1816 he was placed in command of the Spanish Royalist army in Upper Peru. In this capacity he was in constant conflicts with the natives and numerous uprisings gave him the opportunity to display his military ability. He was, however, defeated by the patriots at Salta and Jujuy, and owing to disagreements with the viceroy in regard to the conduct of the army during the campaign, resigned in 1819, but was at once made lieutenant-general and president of the council of war. Not long after this he was again appointed to the command of the army to suppress the uprising under San Martin, and on 29 Jan. 1821, upon the deposition of the viceroy Pezuela by his officers, he became viceroy. He was not able to stem the tide of San Martin's successes and on 6 July 1821 was forced to evacuate Luna, retreating to Cuzco. From here he directed his army and maintained it for over three years against the patriots without any assistance from Spain, and keeping his ground in the interior with great skill and resolution. He was finally defeated on 9 Dec. 1824 by the patriot leader, General Sucre, in the battle of Ayucucho. Though outnumbered by the Royalists, the patriots won the battle and Serna with his whole army was captured. He was severely wounded during the fight, and was afterward released and sent back to Spain, where he died at the age of 62.

SEROUS MEMBRANE, a delicate glistening tissue of flattened endothelial cells, supported by a fibrous and elastic layer in which are capillaries and lymphatics, that glistens on exposure. The serous membranes of the human body are so called because moistened by a serous fluid, and form closed sacs. For the most part they line certain cavities of the body and are reflected over the surface of the organ or organs contained in the cavities. The portion of the membrane lining the walls of the cavity is known as the parietal portion, the other is the visceral portion. The serous membranes, six in number, are the peritonæum, lining the abdominal cavity and reflected upon the stomach, liver, intestines, etc.; the two pleuræ lining the thoracic or chest cavity, and reflected upon the lungs; the pericardium, a fibro-serous sac covering or enclosing the heart; and the tunica vaginalis, a closed sac surrounding each testicle. In the female, where the ovum passes from the ovary into the Fallopian tube, the peritonæum is not a closed sac. The serous membranes are kept moistened by a watery lymph-like fluid, a variety of serum, which, if secreted in large quantity, as in dropsy, may produce bad results. Lymphatic vessels open freely on the surface of serous membranes, hence they are sometimes spoken of as lymph-sacs and the cavities they line as lymph-cavities. A grave danger arising from injuries and inflammation of serous membranes is the absorption of septic material by the lymphatics. Dropsical effusions, hemorrhage, formation of pus and deposits of fibrous exudations which cause adhesions and prevent mobility of viscera are the principal results of inflammation of these membranes. See PERITONEUM.

SEROW, a shaggy goat-antelope (*Nemorrhœdus bubalinus*) of the Himalayas, where it

frequents, singly, or in family parties, the roughest slopes, at an altitude between 6,000 and 12,000 feet. Its habits are similar to those of the goral, Rocky Mountain white goat (qq.v.) and other members of the genus, all of which are called "serows" by some writers. Consult Lydekker, 'The Game Animals of India' (1907).

SERPA PINTO, sar'pä pēn'tō. See PINTO, ALEXANDRE ALBERTO DA ROCHA SERPA.

SERPENT, (1) *in astronomy,* one of the 48 varieties of ancient constellations extending serpent-like through a wide expanse of sky. (2) *In music,* an almost obsolete bass instrument, consisting of a wooden tube, about eight feet long, increasing conically from one inch diameter at the mouth-piece to four inches at the open end, twisted into U-shaped turns, followed by a large circular convolution. This is covered with leather, and has a mouth-piece like a horn or trombone, and keys for the several notes to be produced. The serpent is a transposing instrument, being in B flat, and the part it is to take is, therefore, written a note higher than its real sound. Its compass is three octaves and one note.

SERPENT-CHARMING, an art largely practised in Egypt, India and other Eastern lands; there are allusions to it in the Hebrew sacred books, namely, Ps. lviii, 5, the adder which will not hearken to the voice of charmers; Eccles. x, 11 and Jere. viii, 17; also in some of the Greek and Latin classics. The power of charming the most formidable serpents, as exercised by the snake-charmers, is unquestionable; nor is it true that before making an exhibition of their art the charmers always extract the poison fangs of the creature, though that is often done. Dr. Davy, in his 'Interior of Ceylon,' expresses his belief in the reality of this singular power. "I have examined the snakes," he writes, "and have found the fangs in and uninjured. These men do possess a charm, though not a supernatural one — namely, that of confidence and courage. . . . They will play their tricks with any hooded snakes (*Naja tripudians*), whether just taken or long in confinement, but with no other kind of poisonous snakes." The serpent-charmers are sometimes employed to rid gardens of serpents; and they readily recognize when a serpent is concealed anywhere. In practising their art for this purpose, as also in their exhibitions, they employ a kind of flute in aid of their incantations. When the serpents issue from their hiding places the performer secures them by pinning them to the ground with a forked stick. Those familiar with hypnotism and the French fad for hypnotizing chickens, that flourished in Paris early in the 19th century, will easily recognize that serpent-charming is hypnotic in character.

SERPENT-EAGLE, the secretary-bird (q.v.).

SERPENT-HEAD, or **WALKING-FISH,** a fish of the East Indian and African genus *Ophiocephalus,* the type of a family, allied to the climbing perch, and like it able to live a long time out of the water, and to travel by wriggling through moist grass, from one pool to another. The body is elongate, two to three feet long, and covered with medium-sized scales, those on the depressed head being platelike. About 30 species are known, inhabiting many parts of Asia, the commonest being *O. striatus,* which is sometimes found torpid in dried-up pools and irrigation tanks. When living in muddy water they must rise to the surface from time to time to take in air, or they will smother to death. These fishes are eaten throughout the Orient.

SERPENT-WORSHIP, or **OPHIOLATRY,** a primitive form of religion which is still found existing among uncultured races. The serpent's change of skin may well have been suggestive of resurrection and immortality; the more common supposition that the serpent was regarded by his savage worshippers as the personification of evil and of maleficence, and as a power to be appeased by gifts and worship, does not appear to be justified by the reports of travelers, though the Apophis-serpent of the Egyptian Hades, as well as the wicked Aji Dahaka of the Zoroastrians, were undoubtedly worshipped purely through fear. The brazen serpent erected by Moses in the wilderness and afterward preserved until the days of Hezekiah was broken in pieces by that king (2 Kings xviii, 4), the image having been made an object of religious worship; this was apparently a recrudescence of primitive serpent-worship among the people of Judah. The brazen serpent, it is conjectured by Renan ('Hist. Peuple d'Israël I, xi), was a primitive idol of Jahve. In the Biblical narrative Satan assumed the form of a serpent; among the ancient Egyptians, Typhon was the evil deity, and this idea has generally persisted in Asia, and is apparent in the hieroglyphics of both the Chinese and Mexicans. The serpent whose head the Messiah was to crush, in heathen fable became the hydra of Hercules, and in India the great monster over whom Krishna triumphed, while Roman mythology developed the 100-headed snake slain by Jupiter. We see a trace, and more than a trace, of a primitive worship of the serpent in the great serpent which guarded the citadel of Athens and which was fed every month with honey-cakes; also in the embassage from Rome on the occasion of a plague, to the temple of Æsculapius at Epidaurus, whence was brought a living serpent which was received at Rome with great ceremony. Serpent-worship is still extensively practised in India. Among no people has the mystery of this worship weighed more than on the aborigines of America. It has given name to rivers: examples, Kennebec and Antietam. The name for *spirit* and *snake* are one among the Dakotas, the Shawnees and the Sacs. The Ojibways and other aborigines dread to kill a rattlesnake, and if they find one in their path they pray it to go away and spare them and their families. In Mexico sculptured images of serpents are found as large and as carefully wrought as those of India. There is a vast amount of literature on the subject, which covers the folklore of all peoples, and the serpent seems to have been worshipped more than any other creature, and to have been associated with the idea of fertility or fecundity. In many East Indian ceremonies the serpent deities are constantly associated with women; certain priestesses were selected for their purity, and other women were chosen as "wives" of the snake, and participated in licentious rites. The lore of the serpents is much mixed with dragon literature. Consult all folklore books, and Brinton, 'Myths of the New World' (1896); Hartland, 'Primitive Paternity' (1909); Frazer, 'Golden Bough'; Deane, 'Serpent Worship'; Lawson, 'Modern Greek Religion' (1910); Bourke, 'Snake Dance of the Moquis'; Fowler, 'Roman Festivals'; Fergusson, 'Thee and Serpent Worships' (London 1869).

SERPENTINE, hydrous magnesium silicate, is an abundant and widely distributed mineral. Its hardness varies more than that of any other mineral, ranging from 2 in the variety picrolite up to 6 in bowenite. Its specific gravity varies from 2.14 in some chrysotile to 2.80 in some precious serpentine. It often occurs in pseudomorphs, over a dozen of which have been described. Among these the most common are the pseudomorphs after chrysolite, enstatite, amphibole and pyroxene. Its varieties are mostly based on structure. The massive include precious serpentine, translucent and of rich, dark or pale green color; common serpentine, similar in color, but nearly opaque. The lamellar varieties include antigorite and marmolite. Williamsite, though more massive, is one of the lamellar varieties. It is apple-green and translucent and is often cut and polished. Chrysotile is fine fibrous, the fibres being easily separable and flexible. Its lustre is silky, color pale green, yellow or brown. It often occurs in veins in massive serpentine. See ASBESTOS.

Serpentine rocks occur in masses often of enormous dimensions. They are formed, as indeed are all serpentines, by the alteration ("serpentization") of other minerals, most commonly olivine (peridotyte), pyroxene or amphibole. They are often more or less mixed with limestone or magnesite, these minerals giving the mass a clouded or veined appearance. Verd antique (q.v.) or ophicalcite and many other serpentine rocks are known as serpentine marbles and are extensively used in interior decoration. Some of them are very highly prized for their rich green, yellow and brown colors, others are beautifully mottled with red. (Consult Merrill, 'Stones for Building and Decoration'). Many buildings in Philadelphia and other cities are constructed of a green serpentine rock from West Chester, Pa. Among the most noteworthy regions producing serpentine are England, Ireland, Maryland, New Mexico, California and Washington.

SERPENTS, or **SNAKES,** reptiles of the saurian class *Ophidia,* characterized by an elongated, cylindrical, limbless, scaly form, and distinguished from lizards (q.v.) by the fact that the halves (*rami*) of the lower jaws are not solidly united at the chin, but movably connected by an elastic ligament. The vertebræ are very numerous, gastrocentrous and procœlous, Each vertebra is connected with its neighbors that is, hollow in front and convex posteriorly, by free ball-and-socket joints, horizontal connecting projections preventing twisting, while admitting of considerable vertical and horizontal play; and bears ribs, which may exceed 300 pairs in number. No front limbs, sternum or sacrum are ever developed, but vestiges of ancestral hind limbs remain in the boas, pythons and closely related forms, and in some lowly burrowing groups. The ventral tips of each pair of ribs are fastened to opposite ends of one of the abdominal scutes (gastrosteges), forming a mechanism for locomotion in the absence of legs. Progression is by three methods. "The animal," says Stejneger, "may glide, perhaps in a perfectly straight line, by use of its ventral scutes, each, on finding some resistance, forcibly pushing the animal forward. It may walk by allowing each scute to act as a pair of feet, the lateral portions being alternately carried forward and pushed back; an undulatory movement, like that of myriapods, would result from this mode. The third method is by pushing, as the underground snakes do almost exclusively. Ordinarily ophidians combine the three methods. The sea-snakes progress by an undulatory movement and by the sculling action of the paddle-like tail. . . . It is impossible for any ophidian to jump, and it is with extreme difficulty that more than the anterior half of the body can be raised, unassisted, from the ground."

Structure.— The skull of serpents consists of a series of bones homologous with the cranial bones of other vertebrates, but slight and, outside of the brain-box, joined by elastic ligaments, permitting great distention of the mouth and throat, so that serpents are able to swallow objects of large bulk. This arrangement is further facilitated by the quadrate bone, which articulates the lower jaw with the skull, being movable. The jaws are provided with hooked teeth of conical shape, ossified to the jaws, but not lodged in distinct sockets, which are useless for mastication, and are of service only in holding the prey in the mouth. The teeth are never permanent, but are capable of being renewed, like those of fishes, whenever the old ones become worthless. Valuable characters in classification are derived from the conformation and disposition of the teeth. Thus in the typical, non-poisonous serpents, both jaws and the palate bear continuous rows of solid conical teeth and the upper maxillæ are immobile. In the viperine snakes simple conical teeth are absent on the upper maxillary or jaw bones, which are of small size and can be moved upward or downward at will. The upper maxillæ in these latter snakes further bear each a so-called "poison-fang," an elongated canaliculated tooth perforated by a canal which communicates internally with the duct of the poison-gland. These fangs are capable of being elevated or depressed. (See RATTLESNAKE; VIPERS). As regards their internal structure serpents present few points requiring notice. The digestive system comprises large salivary glands, a distensible gullet, stomach and intestine, which terminates in a cloaca — the external opening of the cloaca being transverse in conformation. There is no urinary bladder, yet serpents drink a great deal of water and must have it in abundance when kept in captivity; at the same time they have remarkable powers of long fasting. The heart (see REPTILES) consists of three chambers only — two auricles and a ventricle, the circulation being of the mixed character characteristic of reptiles and amphibians. The lungs, ovaries and other paired or symmetrical organs exhibit an abortive condition of one of these structures, the left lung, for example, far outgrowing the right one, and doing all the work. "The trachea is long and may be provided with air-cells and the

larynx can be projected during the tedious process of swallowing, when, too, the air-cells and the posterior reservoir come into play." All these modifications are in adaptation to the slender, elongated form of the animal and to its methods of life. The sexes are perfectly distinguished and the penis of the male consists of a pair of organs (hemipenes), grooved on their inner sides, which when erected are pressed together and so form a tubular intromittent instrument. The special modifications of this organ constitute one of the most stable "characters" or criteria by which to classify the subdivisions of the *Ophidia*. The eggs of the viperine, and some other snakes, are retained within the oviduct of the female until the young escape, so that these species are ovo-viviparous. In the majority of serpents, however, the eggs, which are oblong and have a leathery integument, are deposited in warm soil, among rotting wood, in heaps of decaying vegetation or in some similar warm and concealed place, where they are left to mature; but the pythons coil about their eggs and incubate them by the feeble heat of their bodies; and all kinds wait for and protect their young when born. It is true, to a limited degree, that at times of danger, the little snakes take refuge in the capacious mouth and throat of the mother.

Sense-organs.— The senses of serpents vary in respect to acuteness. The skin is highly sensitive to touch, and a few snakes have tentacle-like outgrowths upon the muzzle supposed to be "feelers"; this sense is principally developed, however, in the tongue, which is thread-like, forked at the end, usually black, very long and far-protrusible through a notch in the upper lip when the mouth is closed. With this tongue — mistaken by the ignorant for a "sting"— the animal tests the quality of all objects as it moves about and gains most of its information. There are no external ears, but the hearing in some, if not in all, is good. The nostrils are at the tip of the snout, and the sense of smell is keen,— serpents find and follow their prey mainly by its aid. The eyes of serpents have no eyelids, yet they sleep; a watch-glass-like layer of the skin overlies and protects the ball and peels off in the annual exuviation of the outer skin (see MOLTING). The pupil is usually round, but in the boas and some others is a mere vertical slit.

Phylogeny.— Serpents are the latest and highest development of the reptilian type and seem to be the only representatives of the class which are now flourishing rather than declining. They are distributed principally in the warmer regions, only the smaller forms extending into the northern temperate zone. Where the climate is even moderately cold in winter snakes creep into animals' burrows, holes among loose rocks and other underground places and undergo hibernation,— often many entwine together, especially toward spring, when they are seeking mates. A similar retirement (æstivation) occurs in countries exposed to annual periods of heated drought. By far the greater number of ophidians are terrestrial, although some are arboreal, others amphibious and a few exclusively marine. About 400 recent genera and nearly 1,800 species are known, but only about 35 fossil forms, according to Eastman, who reminds us that many fragmentary remains of the Cretaceous Age, at first regarded as ophidian, are now known to be dolichosaurian. Tertiary snakes can hardly be distinguished from modern species and occur in all parts of the world, including the Eocene of New Jersey and the Eocene and Miocene of the Rocky Mountain region. These remains and other considerations make it plain that the serpents are an outgrowth from the same ancestral stock (*Sauria*) as the lizards.

Classification.— The following is a progressive arrangement of families, from lowest to highest in organization, some of them including several groups formerly regarded as separate families:

1. *Typhlopidæ*. Burrowing snakes of southern Asia and the islands of the Indian Ocean. Have vestiges of the pelvis and the eyes covered by skin.

2. *Glauconiidæ*. Replace the Typhlopidæ in Africa and tropical America.

3. *Ilysiidæ*. Burrowing snakes of the tropics with vestigial hind limbs. Tail short and blunt (blind snakes).

4. *Uropeltidæ*. Burrowing snakes of Ceylon and southern India. Tail truncate, ending in a flat shield (shield-tails).

5. *Boidæ*. Large, typical snakes, with rudiments of hind legs and pelvis and ventral scales transversely enlarged. The family comprises about 70 species, found all over the world in tropical and subtropical countries and noted for their rapacious habits and ability to crush animals, large as compared with themselves. Typical genera are *Python* (q.v.), with about 20 Palæo-tropical and Australian species, one in Mexico, and the *Boa* (q.v.), which has many South American species and a few in Madagascar.

6. *Xenopeltidæ*, one Malayan species.

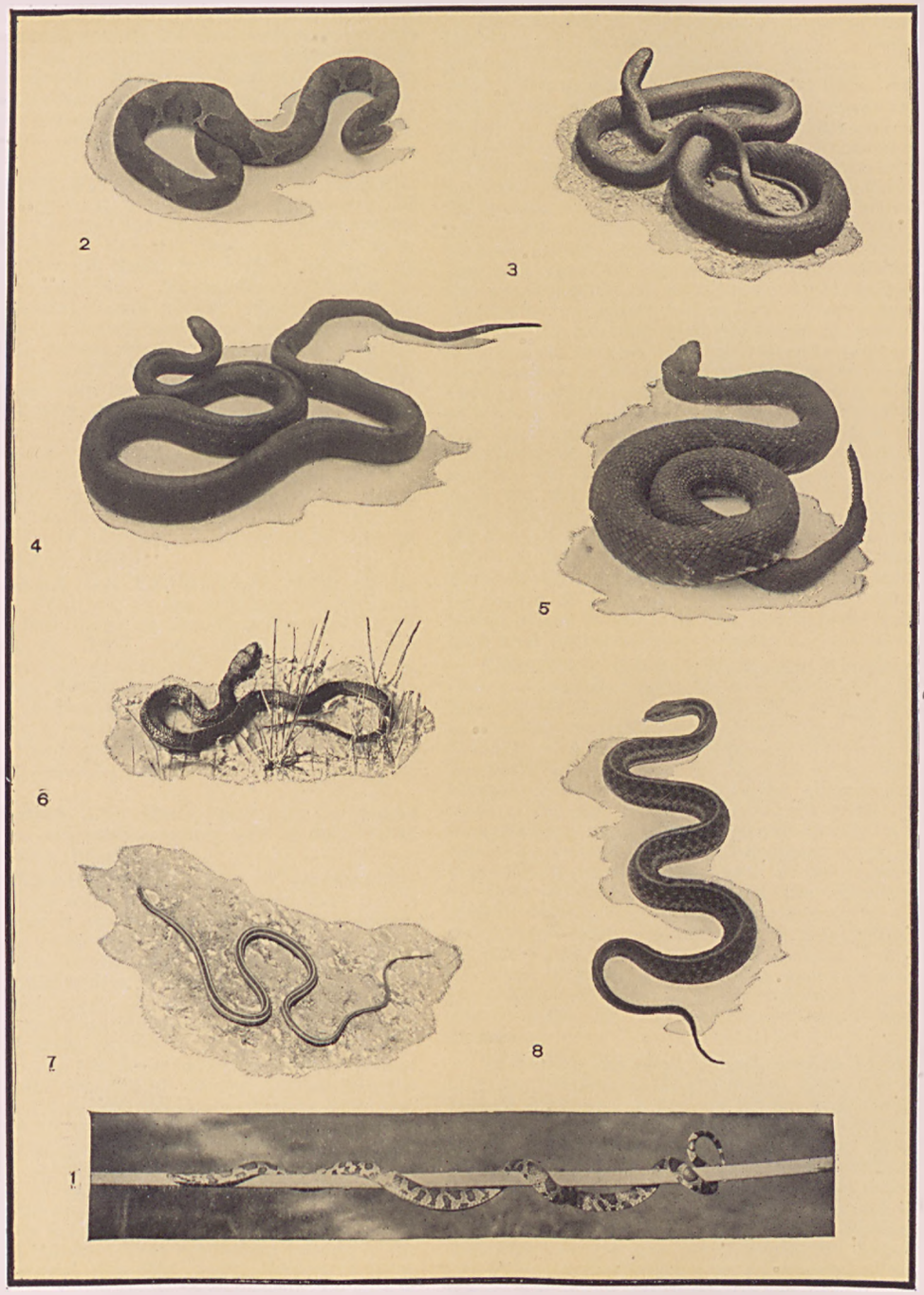
7. *Colubridæ*. Includes 90 per cent of all snakes; the pterygoid bone reaches the quadrate. It is divisible into three series: (1) No teeth grooved; (2) the posterior maxillary teeth grooved (poison-fangs); (3) the anterior maxillary teeth grooved (poison-fangs). The first includes the non-venomous colubrine snakes of more than 1,000 species, such as the blacksnake, garter-snake, water-snake, hog-nose and the ordinary harmless serpents of all parts of the world. The second group (2) comprises opisthoglyph, partly poisonous snakes, found in the tropics of both continents, terrestrial, aquatic, even marine species. The third group (3) contains many violently poisonous, proteroglyph snakes. Here fall the cobras, coral snakes and other elapine serpents, whose bite is to be dreaded.

8. *Amblycephalidæ*. Tropical snakes, in which the ends of the pterygoids are free, not reaching the quadrates. Harmless, but resembling poisonous snakes.

9. *Viperidæ*. Maxillaries, short and movable, so as to erect the poison-fangs, which are the only maxillary teeth. Two subfamilies: (1) the Old World vipers; (2) the rattlesnakes (q.v.) and related pit-vipers.

Bibliography.— Books mentioned under REPTILES; also Hopley, 'Snakes' (London 1882); Stejneger, 'Standard Natural History,' Vol. III (Boston 1885); Gadow, 'Amphibia and Reptiles' (New York 1901); Fayrer, 'Thanatophidia of India' (London 1874); Ewart, 'Poisonous Snakes of India' (London 1872); Kreft, 'Snakes of Australia' (Sydney

AMERICAN SERPENTS



1 Milk Snake
2 Copperhead
3 Blacksnake
4 Mountain Blacksnake
5 Eastern Rattlesnake
6 Water-snake
7 Ribbon-snake
8 Garter-snake

1869); Holbrook, 'North American Herptology' (Philadelphia 1842); Ditmars, 'The Reptile Book' (New York 1907); Cope, 'Crocodilians, Lizards and Snakes of North America' (Washington 1900). The last named is the most complete work on American serpents and is published by the Smithsonian Institution, in whose annual reports and other publications will be found much additional valuable information, especially the contributions by Yarrow, Stejneger, Mitchell and Hay.

ERNEST INGERSOLL.

SERPUKHOV, sĕr-poo-hŏf', or **SERPUCHOW,** Russia, a town in the government of Moscow, on the Nara River, 57 miles southwest of the city of Moscow, comprising three divisions. One of these, the Fort, is enclosed by walls, now in ruins. An ancient cathedral is the only building worth noting. Agriculture is an important industry, and there are manufactures of wool, cotton, leather, paper, chemicals, etc. An active trade with the interior is carried on, especially over the Oka River.

SERPULA, a tube-making marine chætopod worm (see CHÆTOPODA), which often lives and reproduces its tubes in such close proximity over considerable areas as to form, with the cemented fragments of coral, sea-shells, sand, etc.; caught among its entwined tubes may be large masses of rock. Such are to be seen on the coast of Florida.

SERRA DA ESTRELLA, sär'rä dä ĕs-träl'yä, Portugal, in the province of Beira, is the highest range of the country, attaining an altitude of 6,540 feet. It belongs to the Guadarramas system, and is a continuation of the Gata Range in Spain, terminating in the Serra de Lousão. Numerous lakes, some of which are warm, occur in the ridge, and the rivers Condicira and Unhaes form fine cascades. The surrounding scenery is remarkably picturesque.

SERRA DO MAR, doo mär, a coastal range of mountains running east by north from Sao Paulo, Brazil.

SERRANIDÆ, a family of acanthropterygian bony fishes typified by the sea-bass (q.v.). The body is generally rather short and heavy, slightly compressed, with moderate or large head and covered with usually ctenoid scales. The mouth is usually large and is provided with numerous teeth all of one kind arranged in broad bands on the vomer and palatine bones as well as on the jaws. The fins are well developed and the dorsal spines usually large and strong but variable in number. Sometimes the dorsal and caudal fins are furnished with filaments or streamer-like appendages. The swim-bladder is usually comparatively small and attached to the body walls. This is a large family of carnivorous fishes, including about 70 genera and more than 400 species, almost all of which are marine and especially abundant in tropical waters. They are closely related to the *Percidæ* and, like that family, include a large number of valuable food-fishes. In North American waters no less than 28 genera and 90 species are found, almost all of which are good and a number very important food-fishes. Among them may be mentioned, in addition to the sea-bass, the striped bass, white perch, yellow bass, jew-fish, groupers and squirrel-fish, most of which are described elsewhere in this work. Consult Jordan and Evermann, 'The Serranidæ,' *Bulletin No. 8* (United States Fish Commission, Washington 1890).

SERRANO Y DOMINGUEZ, sĕr-rä'nō ē dō-mēn'gäth, **Francisco,** DUKE DE LA TORRE, Spanish statesman: b. Anjonilla, Andalusia, 18 Sept. 1810; d. Madrid, Spain, 26 Nov. 1885. He entered the Military College in 1822, became an ensign in 1825 and served in the coast guard until 1833, but after the death of Ferdinand VII he gained favor with Queen Isabella and espoused the cause of the child queen Isabella II, against the Carlists. He played an active part in the troublous politics of Isabella's reign, at times holding high offices in the administration and again at variance with the ministry. For implication in the insurrection of Saragossa in 1854 he was exiled but in June returned and took part in the successful revolution of Espartero and O'Donnell. In 1857 he was sent as Ambassador to Paris, and in 1860 he went to Cuba as captain-general. In 1866, after the overthrow of O'Donnell's government, Serrano was banished, but in 1868 returned, assisted in overthrowing the queen's army and forced her to leave the country. He then acted as regent until the accession of Amadeus of Savoy in 1870. He was successful in his warfare against the Carlists both in 1872 and in 1874, and during much of the latter year was at the head of the government. He resigned the monarchy into the hands of Alfonso XII, in 1875, but continued active in political life, and in 1883 was appointed Ambassador to France.

SERRELL, Edward Wellmann, American civil and military engineer: b. 5 Nov. 1826; d. New York City, 25 April 1906. He entered the engineering profession and was employed on the Erie Railroad, the Central Railroad of New Jersey, the Panama survey, the Niagara bridge, the Hoosac Tunnel and other large engineering works. He was an assistant to the chief of topographical engineers, United States of America; entered the Federal engineer corps as a colonel in the Civil War; was at the capture of Fort Wagner and devised the «Swamp Angel» battery that shelled Charleston, S. C. He became chief engineer for the Department of the South, and was in 126 actions, being brevetted brigadier-general. He suggested improvements in guns and gun-carriages, and issued some 50 reports on railroads and bridges.

SERRES, Dominic, Engish marine artist: b. Auch, Gascony, 1722; d. London, 1793. He is said to have been a nephew of the archbishop of Rheims and was intended for the Church, but this not suiting his taste he ran away from home and became a sailor, eventually becoming master of a Spanish trading vessel. Being taken prisoner by a British warship, he was carried to England, where he afterward resided. Having had some instruction in drawing, he began life in his adopted country as a painter of naval pieces, for which the wars of the period furnished subjects. Serres became a member of the Incorporated Society of Artists in 1765 and exhibited with them for two years. On the establishment of the Royal Academy in 1768 he was chosen one of the foundation members. Among the pictures exhibited by Serres at the

Royal Academy were 'The Siege at Fort Royal, Martinique' (1769), and 'The Engagement between the Serapis and the Countess of Scarborough with Paul Jones and his Squadron' (1780). In 1792 he was appointed librarian to the academy, and also marine painter to George III.

SERRES, John Thomas, English marine artist: b. London, December 1759; d. there, 28 Dec. 1825. He was the elder son of Dominic Serres (q.v.), and followed his father's profession. In 1780 he began to exhibit at the Royal Academy. In 1790 he went to Italy to further study his art. In 1793 he succeeded his father as marine painter to the king and was also appointed marine draftsman to the Admiralty. In 1801 he published a translation of 'The Little Sea-Torch,' a guide for coasting ships, and in 1805 his 'Liber Nauticus,' or instructor in the art of marine drawing. He had married in 1791, and although legally separated from his wife in 1804, her pretensions to be the Princess Oliver of Cumberland involved him in many difficulties throughout the latter part of his career.

SERTORIUS, sẽr-tō'rĭ-ŭs, **Quintus,** Roman general: b. Nursia, Italy, about the end of the 2d century B.C.; d. Asia Minor, 72 B.C. He served with distinction under Marius against the Teutones and in Spain, and held the office of quæstor in Cisalpine Gaul, but becoming embroiled in a quarrel with Marius, who had opposed his election as consul, he fled to Spain, where he collected a force to oppose the army of subjugation sent by Sulla to subdue that country. But the means of Sertorius were unequal to the conflict, and embarking at New Carthage he passed into Africa and successfully commanded the subjects of Mauritania, who were in revolt against their king. This success gained him the confidence of the Lusitanians, who placed him at the head of the large force with which they were opposing Sulla, and Sertorius withstood for a number of years a much superior force of Romans successively commanded by Annius, Metallus Pius and Pompey. But Sertorius loved Rome and fought with reluctance against its forces. He, therefore, now accepted the offer of Mithridates, 3,000 talents and 40 ships of war, to ally himself with him in an effort to recover Bithynia and Cappadocia. Sertorius received the sum and was making preparations to push the war, when he was slain through the treachery of Perperna, who had joined him two years before and who now assassinated him at a feast.

SERUM THERAPY, a mode of treatment of disease by means of the modified blood serum of man or other animal. It is one of the subdivisions of therapeutics (q.v.) and in its more scientific details is of distinctly modern development. In its early and crude forms, however, serum therapy is of very great antiquity. Serum therapy is employed both for its protective power as well as for its curative aid. Inasmuch as the gradual growth of knowledge concerning the protective power of blood serum has been in large part an offshoot of the study of bacterial poisons it is usual at the present time to include under the study of serum therapy a number of related subjects — particularly the effects of bacteria toxins in disease, hence they will be included in this account. It is related that King Mithridates knew that by taking small doses of snake poison he might render himself immune to larger doses and in this old, well-recognized principle one sees the early shadowings of the principle of isotherapy — the principle now so fully recognized that after all the body tissues are the best defense against infectious diseases. The exact details of all the protective processes are not as yet known, but enough have been discovered to place serum therapy on a sound basis. It has been known for a long time that many infectious diseases rarely attack a person a second time. This is characteristically true, for instance, in measles, scarlet fever and whooping cough. It is less true for diphtheria, for typhoid fever, for pneumonia. When the discovery of bacteria made it evident that many of these diseases were due to these low plants, it was then shown that injections of the bacteria caused the disease and that a certain grade of immunity was produced. Following this it was learned that it was not necessary to inject the bacteria themselves to get symptoms of the disease, but that the injection of the filtered products of their growth, that is, their toxins, might cause the same phenomena, and finally it was shown that as a result of the injections, either of the bacteria, or of their dead bodies, or of their filtered toxins, certain changes took place in the blood and that new substances were formed in the blood which in different ways counteracted the effects of the injections; finally it was a logical step to develop these anti-bodies — as they have been called — in the blood serum of another animal and use this serum in the treatment of the particular disease in man. This is the simple explanation as applied in the serum therapy, say of diphtheria. After the success of the anti-diphtheritic serum became established it was thought that all of the infectious diseases would be immediately conquered by an application of the same principle but in practically all instances it was found that whereas the principle worked out very definitely for diphtheria, it did not apply to other infectious diseases as directly, and the results while at times seemingly excellent, at other times were very disappointing. This disparity between the good success in diphtheria with antitoxic sera and the lack of results in other infections served to draw attention to the fact that the protective mechanisms in the blood serum were much more complicated than was at first thought. A new line of study was opened when it was shown that in some instances following the use of protective sera, the bodies of injected bacteria resulted from the use of the serum. Thus bacteriolysis were found to be destroyed, that is, in addition to a chemical antidote, antitoxic serum, a bacteria-destroying serum became a possibility. It is highly probable that in tuberculosis this bacteriolytic action of the blood serum is constantly at work. At about the same time, or even previously, the peculiar power that certain blood sera possessed in agglutinating or causing bacteria to clump up and hang together was observed in typhoid fever. This led to the discovery that certain specific substances, called agglutinins, were present in certain instances and that these agglutinins were protective devices elaborated by the body in its struggle with infectious micro-organisms. This peculiar property of agglutinating bacteria has developed one of the most reliable of tests — the so-called Widal reaction for the detection of typhoid fever. Thus far practical agglutinating sera have not been devised. Agglutination seems to be an active factor in immunity rather than a passive one. As shown in our article on IMMUNITY two distinct phases are present, an active and a passive immunity, and at the present time it is the endeavor of serum therapy to bring into defensive action as many of the factors as possible. Thus by injecting into the human body living bacteria, which have had their virulence modified, either by growing them in oxygen or by attenuation through growth in certain animals, or by subjection to high temperatures, or by growth in weak antiseptic media, a certain type of active immunity may be conferred. This principle is made use of in Haffkine's anti-cholera injections. In the sera used in combating the plague and in immunization against typhoid, injections of the dead bodies of bacteria are practised. Finally active immunity may be induced by the injections of filtered bacterial toxins. These three types of treatment apply the principle of prevention, however. They are meant to so enhance the protective agencies of the blood serum that infection shall not take place. They are not in any sense of particular service after the disease has once begun. They are only the first stages in the development of a curative blood serum. As illustrations of these methods the following may be mentioned: (1) Pasteur's preventive inoculations against anthrax in sheep — highly successful. The immunity lasts about a year (see ANTHRAX). (2) Jenner's vaccination against smallpox (see SMALLPOX and VACCINATION). (3) Haffkine's anti-cholera inoculations. Large bodies of men in India have been inoculated first by an attenuated virus, then by a strong virus. The results thus far are not conclusive, but they are encouraging (see CHOLERA). (4) Haffkine's anti-plague inoculations. (See PLAGUE, BUBONIC). In this the dead bacteria of the plague and their toxins are injected. These are prepared in a specified manner. According to recent reports of the Indian Commission the results are highly satisfactory, but better methods for standardizing the dosage are desirable. Other methods of combating the plague after it has attacked the body are in vogue. These belong to the section on passive immunity modes of treatment. Yersin and Lustig have developed these sera. (5) Wright's anti-typhoid inoculations. In these dead bacteria and their toxins are also used. The results reported from time to time are encouraging. In India of 4,502 soldiers inoculated only about 1 per cent contracted the disease, whereas of 25,000 uninoculated soldiers in the same station 2.5 per cent contracted the disease. In the Spanish War typhoid fever was a scourge, in the recent World War the use of anti-typhoid vaccinations practically wiped out the disease, as effectively as the smallpox vaccinations wiped out that disease. (See TYPHOID FEVER). (6) Pasteur's method of treatment of hydrophobia is an application of these same principles. In this the body is slowly immunized by using modified virus grown in a special medium, the spinal cord of dogs or rabbits, and before the actual infection takes place, immunity is effected during the incubation period of the disease. (See HYDROPHOBIA). (7) Maragliano's anti-tuberculosis vaccination. This is one of the recent (1904) efforts to confer immunity in this dread disease. The investigator after a number of years of experiment both in laboratories and in hospitals believes that it is possible to produce a specific therapy for tuberculosis. He has been able to immunize lower animals against the disease and his methods offer much hope for successful human immunization. The main principle of Maragliano's therapy is to create a peripheral focus of tuberculosis inflammation without living tubercle bacilli and bring about by this means the active production of defensive materials. These defensive materials are antitoxins, bacteriolysins and agglutinins. It is yet too early to pronounce upon Maragliano's success, but his studies have served to reawaken a keen interest in the serum treatment of this lisease which by reason of many failures had almost become despondent. The good work done by Trudeau in this country long ago began to bear fruit under many different forms, although as yet no secure immunization against tuberculosis has been accomplished. Anti-meninococcus serum for cerebro-spinal meningitis has been effective and a possible serum for poliomyelitis is now being perfected (1919). It is needless to point out that all of these advances have come through the honest workers in the medical profession. Secret commercial enterprises are notoriously unreliable and border on quackery if not criminality. All of the methods which have just been enumerated are prophylactic rather than curative. They seek to prevent the diseases in question. The use of antitoxic and anti-bacterial sera — serum therapy in the narrow sense — is meant to be distinctly curative of the conditions after infection has definitely taken place. Technically speaking these sera bring about what is known as passive immunity. At the present time two distinct kinds of sera are being used. (1) Antitoxic sera and (2) Anti-bacterial sera. In both of these anti-bodies are developed in the serum of another animal. (1) The antitoxic sera are the most promising — that for diphtheria (q.v.) having been proven to be the most efficient. Concerning its value there is at the present time almost no doubt A great reduction in the mortality of diphtheria has resulted since the beginning of its use by Behring in October 1894. Anti-diphtheritic serum is developed in the horse. The process of manufacture is described elsewhere. It is important that in practice the serum should be used early in the disease, as it has been shown that the mortality is only about 7 per cent when treatment has been begun on the first or second day, while after the fifth day it seems to be of little service. The amount to be given is very difficult to determine. The other most important antisera are for streptococcus poisoning (blood poisoning), for tetanus, for plague, for pneumonia and for snake bite. Others may in time be developed. In the treatment of acute tetanus (lockjaw), the results have not yet proven absolutely satisfactory; some patients have seemed to be benefited, others not. Two sera are in use. (1) Behring and Roux; (2) Tizzoni. It seems that the latter serum is the

more successful. Some have ascribed this to a diminished virulence of the tetanus organism in Italy. A serious bar to a successful therapy is present in this disease in the great resistance shown by the nerve-cells to the diffusion of the serum. To obviate this, intraspinal and introcranial injections have been practised. The results have not yet proven entirely satisfactory.

The anti-streptococcic sera are in the experimental stage only. Just why results have not been obtained is not yet clear, but there are many different kinds of these streptococci and it may be that each form has its own particular type of poison that can be counteracted only by a serum developed with a similar form. The subject is slowly emerging from a highly technical condition and better results may be hoped for. Very striking effects have been obtained from some of the anti-venom sera, particularly in treating the cobra poisoning, by Calmette's serum, but the subject is still in the experimental stage. Anti-pneumococcic sera are beginning to be available. These will constitute a great blessing when they finally are evolved. The natural history of pneumonia and the known characters of the various types of pneumococci offer considerable hope for conquering this dread disease. Certain types of pneumonia are amenable to their use with success.

True bacteriolytic sera have not yet been devised as specific means of therapy. Such sera, as Yersin's anti-plague serum, which have been made, are thought to act partly as antitoxic, partly bacteriolytic sera, but all of the details are not yet available. Very recently the suggestion has come from Ehrlich that immunity to protozoan diseases is possible. Summarizing the results then of serum therapy it may be said that (A) active immunity can be imparted with great hope of success in smallpox, rabies and anthrax, in animals; in cholera, typhoid, plague. That curative antisera are of positive value in diphtheria and snakebite, and that hopeful results have been obtained in tetanus, plague dysentery, pneumonia, blood-poisoning (streptococcus), meningitis, poliomyelitis, some forms of streptococcus poisons. Further studies may bring more into both the hopeful and positive class. See BACTERIA; BACTERIOLYTIC; IMMUNITY; INFECTION; PATHOLOGY; TOXIN AND ANTI-TOXIN; TOXICOLOGY.

Bibliography.— Wassermann, 'Immune Sera' (1904); Waldheim, 'Die Serum-Bakterientoxin and Organ Präparate' (1901); Encyclopedia Medica Article, 'Therapeutics — Serum Therapy'; Stedman, 'Reference Handbook of Medical Sciences'; Zinser, 'Immunity'; Vaughan, 'Immune Sera,' in special journals devoted to the subject, the 'Journal of Immunology' being one of the most recent.

SMITH ELY JELLIFFE,
Editor 'Journal of Nervous and Mental Diseases.'

SERVAL, a large African wildcat (*Felis serval*), yellowish in color, long-legged and thickly spotted with blackish, which also appears as bars on the legs and rings around the tail. It may exceed three feet in length, besides 15 inches of tail. Its fur is highly valued for its beauty. A smaller species or variety (*F. servalina*) is called by Mivart the servaline cat. Consult Mivart, 'The Cat' (1892).

SERVANTS. See FAMILY LAW.

SERVANTS OF MARY. See ORDERS, RELIGIOUS.

SERVETUS, sẽr-vē'tŭs, **Michael** (properly **MIGUEL SERVETE**), Spanish scholar: b. Tudela in Navarre, 1511; d. Geneva, 27 Oct. 1553. He was the son of a notary, who sent him to Toulouse for the study of the civil law. Excited by the discussions of the Reformers in that city, he began to give his attention to theology, and having formed views of the Trinity antagonistic to the orthodox doctrine, removed to Germany and there printed a tract, entitled 'De Trinitatis Erroribus' (1531), which production was followed next year by his 'Dialogorum de Trinitate Libri Duo.' But he found that the expression of his opinions was obnoxious in Germany, and made his escape to France, under the name of Michael of Villa Nueva. He engaged for some time with the Frellons, book-sellers of Lyons, as corrector of the press, then went to Paris, where he studied physic, and graduated as doctor. At Paris Servetus met Calvin for the first time, and after several meetings an arrangement was made for a theological discussion between them, but Servetus failed to appear. Soon after he quarreled with the medical faculty at Paris, and quitted the city (1538). He first repaired to Charlieu, near Lyons, where he practised three years. In 1538 Servetus published his matured theological system, without his name, under the title of 'Christianismi Restitutio.' The magistrates of Vienna ascertained the name of the author, and Servetus was committed to prison, whence he contrived to escape. Purposing to proceed to Naples he took his way through Geneva, where he was apprehended by the magistrates on a charge of blasphemy and heresy. In order to ensure his condemnation his various writings were sifted for accusations. The magistrates of Geneva were, however, aware that many eyes were on them in respect to this extraordinary treatment of a person who was neither a subject nor a resident, but, properly speaking, a traveler kidnapped in his passage. They thought proper, therefore, to consult the magistrates of all the Protestant Swiss cantons, who, referring the matter to their divines, the latter unanimously declared for his punishment, Calvin being especially urgent and emphatic as to the necessity of putting him to death. As he refused to retract his opinions, he was condemned to the flames, which sentence was carried out. Servetus is numbered among the anatomists who made the nearest approach to the doctrine of the circulation of the blood, as appears from a passage in his 'Restitution Christianismi.'

SERVIA. See SERBIA.

SERVIAN LANGUAGE AND LITERATURE. See SERBIAN LANGUAGE and SERBIAN LITERATURE.

SERVICE-BERRY, one of the common names applied to the rosaceous genus of shrubs or small trees *Amelanchier* (q.v.). There are several species in the north temperate zone, the American ones differing chiefly in habit and in foliage. The leaves are alternate and simple, either toothed or entire, and the five-parted flowers have delicate white petals and are solitary, or more usually in racemes, succeeded by fruits like tiny purplish apples or pears. The species are generally small shrubs, but the *A. canadensis* and *A. botryapium*, the shadbushes and juneberries of the eastern United States, occasionally arrive at the dignity of small trees, with hard brown wood. These are the first shrubs to bloom in the East (while the shad are running), and cover themselves with feathery elongated tassels of fugacious petals, while the leaves are still folded. The haw-like fruits, of somewhat insipid flavor, seldom reach maturity, as they should in June, for then the birds are too fond of them to wait for their ripening. This circumstance militates against the proposed cultivation of the juneberry.

A. alnifolia is the well-known service-berry of western America, frequently mentioned by explorers of the Rocky Mountain region. The purple, rich, although insipidly sweet, berries are about the size of a pea, with a large mucilaginous seeds. They form a favorite food of the aborigines, who cook them or dry them, and add them to dried meat, to flavor pemmican. They grow upon bushes 2 to 12 feet high, with glabrous thick alder-like leaves, nearly orbicular and coarsely toothed. The wood itself is very hard and tough and is used by the Indians for arrows and pipe-stems.

The fruit of the white beam-tree (*Sorbus aria*) is also called service-berry. See also AMELANCHIER.

SERVICE MEN OF THE SPANISH-AMERICAN WAR, an association organized at Lexington, Ky., 5 Nov. 1898. The founders of the society made choice of the designation «service men» as equally distinctive of the men who waited in vain for orders to go to the front, and the more favored ones who lived through the exciting scenes of actual conflict. In the list of charter members are to be found the names of many of the most prominent officers in the army during the war with Spain. They represent all sections of the United States and all shades of political belief, and constitute a guarantee of the permanence of the organization.

SERVICE-TREE, a round-headed, slow-growing European tree (*Sorbus domestica*) of the *Rosaceæ*, attaining a height of perhaps 60 feet. When without flowers or fruit, it is easily confounded with the ash, having pinnate leaves; but the glutinous winter buds help to identify it. The small whitish flowers are numerous, and gathered in panicles at the end of the branches, being succeeded by small rounded or pear-shaped fruit, which is only edible when in a state of incipient decay, being astringent while unripe. The wood is hard, solid and fine-grained, and takes a high polish. It is much in demand for fine cabinet making, for turning and especially for the screws of wine presses; and is very dear. The service-tree is occasionally cultivated.

SERVISS, Garrett Putnam, American author and journalist: b. Sharon Springs, N. Y., 24 March 1851. He was graduated from Cornell University in 1872, and from Columbia Law School in 1874. He was editorial writer on the New York *Sun* until 1892, and has since lectured upon history and astronomy. Among his published works are 'Astronomy with an Opera Glass' (1888); 'The Conquest of Mars' (1898); 'Other Worlds' (1902); 'The Moon' (1907); 'Astronomy with the Naked Eye' (1908); 'Curiosities of the Sky' (1902); 'Round the Year with the Stars' (1910); 'The Moon Maiden' (1915).

SERVITES. See ORDERS, RELIGIOUS.

SERVITUDE, the state or condition of a serf, slave or bondman; state of voluntary or involuntary subjection to a master or employer; service; slavery; bondage; position in life of a servant; — hence, a state or condition of slavish or helpless dependence; as, marriage with rich and ugly old women is splendid servitude. In civil law, the right to the use of a thing, without property in the same, for all or for some particular purposes. It consists either in the right to do some act, as to gather fruit from the estate, or to prevent the owner of the property from doing certain acts, as building walls beyond a certain height, blocking up a window, etc.

SERVIUS, Honoratus Maurus, Roman grammarian. He lived at Rome toward the 4th century A.D., and wrote a commentary on the Grammar of Donatus; some lesser grammatical brochures; and a commentary on the poems of Virgil which an unknown author enlarged and enriched with notes of an antiquarian, historical and mythological character. Consult Thilo and Hagen, 'Servii Honorati Opera' (1878).

SERVIUS TULLIUS, sẽr'vĭ-ŭs tŭl'ĭ-ŭs, sixth king of Rome: d. 534 B.C. He was the son of a slave, but traditions of his descent vary, some declaring his mother to have been an ordinary slave, and others stating her to have been a noble captive of Tarquin. He was given to the queen Tanaquil, and educated in the palace of the monarch, where he became so great a favorite as to receive the daughter of Tarquin in marriage. On the death of Tarquin in 578 B.C., Servius, who was immensely popular with both populace and soldiery, was raised to the throne. His reign is singularly free from wars, Livy mentioning but one, and that against the Veii, brought to a speedy termination. His greatness lay in the establishment of civil rights and institutions. He established the census, extended and beautified the city, taking within its limits the hills Quirinalis, Viminalis and Esquilinus, and building around the city a stone wall which bore his name. He greatly improved the condition of the common people, thereby gaining the enmity of the patricians, whose long-accustomed privileges were thus encroached upon, and in 534 Servius was killed as the result of a patrician conspiracy. Another tradition makes him the victim of an ambitious daughter, Tullia, who caused the death of her husband, sister and father in order to pave her way to the throne as the wife of Tarquin, son of the former king. Consult Niebuhr, 'Roman History and Critical Examinations of the History of Tarquin and Servius.' See also ROME, HISTORY OF.

SERVUS SERVORUM DEI (servant of the servants of God), a title which the popes give themselves. It was used by the Roman pontiffs at an early period, although Paulus

Diaconus states that Gregory the Great (590–604) was the first to adopt it.

SESAME, a rough-hairy, gummy annual plant (*Sesamum indicum*) about two feet high, with petiolate, ovate-lanceolate leaves, opposite below and alternate above, slightly toothed, and mucilaginous. The flowers are solitary in the axils, pale or rose-colored, five-parted, with irregular-lipped corolla, having the tube curved downward and dilated above the oblique base. Sesame has been known from ancient times, originating in the East, where it is cultivated for the sake of its black or white seeds. It is easily grown, does not object to poor soil and has even been introduced to gardens in America, for the sake of the leaves, which in infusion are employed as a demulcent medicine for infantile dysentery. The plant has run wild in the Southern States.

The seeds are very tiny, but are sweet and oleaginous, and are much used for food by Oriental peoples, and are imported into Europe for crushing. They will yield half of their weight in oil, which is yellow, limpid, inodorous and keeps for years without becoming rancid. It is of great economic value, second only to cocoanut oil in the variety of its uses, and can be employed instead of olive oil in very many ways, as for culinary purposes, food, medicine (having a laxative effect), cosmetic, illumination, lubrication, soap-making, etc. It is also employed as an adulterant for olive-oil, but is itself adulterated with peanut-oil. It is known as bene or benne and as gingil-oil. The cake left after the oil has been expressed forms a food for the poorer classes, and is a good food for cattle.

SESAMOID BONES, certain rounded bodies, at first cartilaginous and then bony, found in the tendons of muscles. They derive their name from their resemblance to sesame. The patella or knee-cap is a sesamoid bone. Another is developed in the upper joint of the thumb, and at the corresponding joint of the great toe, these increasing the leverage of the short flexor muscles of the thumb and great toe respectively. In the great majority of mammals sesamoid bones are much more numerous than in man.

SESHA, sā'sha, an imaginary serpent which, when coiled up, is the Hindu emblem for immortality. It is represented in Hindu mythology as having 1,000 heads, on one of which the world rests, and Vishnu reclines on this immense reptile in the primæval waters.

SESOSTRIS, sĕ-sŏs'trĭs, the name given by Greek writers to a king of Egypt, about whose identity there is much controversy, while it seems certain that the achievements attributed by the Greeks to Sesostris were the deeds of a number of Egyptian rulers. By many Sesostris is believed to be identical with Rameses II, the son of Seti (the Sethos of Manetho), and the third king of the 19th dynasty. The name of Sesostris is explained as a corruption of Sestesura, the popular appellation of this Rameses, or of Sethosis (written by Pliny Sesothis), meaning son of Sethos, by which name the same monarch is designated in Manetho. Others think that the Greek Sesotris may be a corruption of Secortesen or some similar form, which is the name of one king of the 3d dynasty and three others of the 12th. The Sesortesen of the 3d dynasty is called Sesostris by Aristotle. The identification of Sesostris with Rameses II has the support of Champollion, Salvolini and others, but is combated by Bunsen on the ground that some of the most striking achievements attributed by Herodotus and Diodorus to Sesostris do not belong to that Rameses. Such are the victorious expeditions into Nubia and Thrace, the immense development under him of the Egyptian navy, the division of the land and its subjection to heavy burdens. But it is generally admitted, as before stated, that the exploits of various monarchs were united by the Greeks in their accounts of the reign of Sesostris, which contain a number of fables in addition, so that it is needless to seek for complete correspondence between these accounts and the monumental records of any single reign. Many of the most remarkable deeds of Sesostris may be assigned with great probability to Rameses III, the founder of the 20th dynasty and the restorer of the power and glory of Egypt. He triumphed over the confederations formed against him by various Libyan tribes; annihilated by a great victory gained in northern Syria a league of Hittites, Philistines and other Canaanitish peoples, and of tribes inhabiting the isles of the Mediterranean, in which sea he maintained a large fleet to support his operations on land. Consult Bridge, E. A. T. W., 'A History of Egypt' (New York 1902); Sethe, 'Sesostris' (Leipzig 1900).

SESSIONS, Court of. See COURT.

SESSUMS, Davis, American Protestant Episcopal bishop: b. Houston, Tex., 7 July 1858. He was educated at the University of the South, Sewanee, Tenn., took orders in 1882, and became rector of Grace Church, Galveston, Tex. He was assistant and rector of Calvary Church, Memphis, Tenn., in 1883–87; rector at Christ Church, New Orleans, La., in 1887–91, and in the latter year was consecrated bishop of Louisiana.

SESTERTIUS, an ancient Roman silver coin worth 2½ asses (hence the name *sesquitertius,* the third a half). The sestertius was the fourth part of a denarius, and when in later times the weight of the ass was reduced, and 16 asses were reckoned to a denarius, the sestertius still retained the same proportion to the latter coin, and thus became equal to four asses. The value of the sestertius, therefore, varied with that of the denarius. About the close of the republic, when the denarius is calculated to have been worth about 17 cents, the sestertius would be worth 5 cents. The sestertius was the unit most commonly employed by the Romans in reckoning large sums of money. For sums below 1,000,000 sestertia, the ordinary cardinal numerals were used with sestertii or sestertia, as the case might be; but if the sum amounted to 1,000,000 or more a numeral in *ies,* after which *centena millia* (100,000) had to be understood, was connected with sestertium (for example, *quadragies sestertium* is 4,000,000 of sestertii, that is, *quadragies centena millia sestertiorum nummorum*). Sometimes the numeral adverb was used alone, and *decies ei dedit* signifies *decies sestertium,* that is, *decies centena millia sestertiorum,* or 1,000,000. The sestertius was often expressed by the symbol HS, which is explained as a corruption either of IIS, that is, II, the numeral two, and S for *semis,* half of LLS, or *libra libra semis,* and as having been originally equivalent to libra or pound.

SESTINI, sās-tē'nē, **Domenico,** Italian numismatist: b. Florence, 1750; d. there, 1832. He was educated at the school of San Marco. In 1774 he left his native city and went to Sicily, where he received from Prince Biscari the commission to arrange his museum at Catania, and from this time he applied himself exclusively to numismatic studies. He published numerous books, chief among which was his 'Systema Geographicum Numismatum' in 13 folio volumes.

SESTO, sās'tō, **Cesare da** (CESARE DA MILANO), Italian painter: b. Sesto, near Milan, about 1480; d. Milan, about 1524. He was probably a pupil, certainly an imitator, of Leonardo, and a picture of his in the Prado, Madrid, is put down by Madrazo as a copy of that master's 'Virgin and Child.' 'La Vierge aux Balances' in the Louvre and a 'Holy Family' in the collection of Lord Monson, formerly thought to be by da Vinci, are now attributed to Cesare. He was on friendly terms with Raphael at Rome, and reproduced some of the qualities of that master's style. The mingled influence of da Vinci and Raphael is apparent in his 'Adoration of the Kings' at the Naples Museum. Other pictures of his are 'Baptism of Christ,' Scotti Gallery, Milan; 'Madonna with St. John,' Melzi Collection, Milan; and a 'Madonna' in the Brera.

SETCHELL, William Albert, American botanist: b. Norwich, Conn., 15 April 1864. He was graduated at Yale University in 1887 and took his Ph.D. at Harvard University in 1890. He was instructor in biology at Yale in 1891–95 and instructor in botany at the Marine Biological Laboratory at Woods Hole, Mass., in 1890–95. Since 1895 he has been professor of botany at the University of California. Author of 'Laboratory Practice for Beginners in Botany' (1897).

SETHITES, a sect in the 2d century that worshipped Seth, the son of Adam, as the son of God, and maintained that he had reappeared on earth in the person of Jesus Christ.

SETHOS I, sē'thŏs, or **SETI,** sē'tī, Egyptian king, the second Pharaoh of the 19th dynasty; which lasted from 1462 to 1288 B.C. He was one of the shepherd race or Hyksos in the eastern part of the Delta. Distinguished for magnificence, he built the temples of Osiris at Abydos, and the hall of columns at Karnak. He established by arms the power of Egypt over a large part of western Asia.

SETON, sē'tŏn, **Eliza Ann Bayley,** American philanthropist, founder of the order of Sisters of Charity of Saint Vincent de Paul in the United States: b. New York, 28 Aug. 1774; d. Emmittsburg, Md., 4 Jan. 1821. She was married to William Seton about 1794 and after his death in 1804 she was received into the Roman Catholic Church the next year, and on 22 June 1809 established at Emmittsburg, Md., a community called by her Saint Joseph's Sisterhood. In 1810 the rules of the French sisters were adopted, with modifications suited to American conditions. The society grew and prospered, and in 1850 a union with the Paris society was effected. In 1846 the New York community became independent of the original American organization. For statistics, consult the article on the society. Consult de Barbary, 'Vie' (1868); O'Gorman, 'A History of the Catholic Church in the United States' (1895).

SETON, Ernest Thompson, American author, for some time known as SETON-THOMPSON: b. South Shields, Durham, England, 14 Aug. 1860. After a brief course at the Royal Academy, London, he spent three years in zoological study on the Assiniboine in Manitoba, published works on the 'Birds of Manitoba' and 'Mammals of Manitoba,' was made government naturalist of the province and executed for the 'Century Dictionary' more than 1,000 drawings of animals and birds. In 1890 he became a pupil of Mosler in Paris, whither he returned in 1894 to study with Ferrier, Bougereau and Gérôme. He exhibited at the Salon several drawings and paintings of wolves, his particular subjects. Among his much-read books are 'Wild Animals I Have Known' (1898); 'The Trail of the Sandhill Stag' (1899); 'The Biography of a Grizzly' (1900); 'Lives of the Hunted' (1901); 'Two Little Savages' (1903); 'Woodmyth and Fable' (1904); 'Animal Heroes' (1905); 'Life Histories of Northern Animals' (1909); 'Rolf in the Woods' (1911); 'Arctic Prairies' (1911); 'Book of Woodcraft' (1911); 'Wild Animals at Home' (1913); 'Wild Animals' Ways' (1916); 'Woodcraft Boys' (1917); 'Sign Talk' (1918). In 1902 he founded the Woodcraft League which was the precursor and in many respects the father of all the present scouting organizations. It is now confined chiefly to America but is of great and growing extent.

SETON, Robert, American Roman Catholic archbishop: b. New York, 28 Aug. 1839, a member and later head of the ancient Scottish family of Setons of Parbroath. He was graduated from the Ecclesiastical Academy in Rome in 1867, and having previously been raised to the rank of private chamberlain to Pope Pius IX, was the same year made prothonotary apostolic, later becoming dean of all the monsignori in the United States. He was rector of Saint Joseph's Church, Jersey City, N. J., from 1876–1902, in the latter year leaving for Rome. He was a lecturer at the Catholic University in Washington and at Seton Hall College, New Jersey, and in 1903 was created archbishop of Heliopolis. Under the pen-name of "Fyvie" he was for some time Rome correspondent for the New York *Times.* He is the author of 'Memoir, Letters and Journal of Elizabeth Seton' (1869); 'Roman Essays' (1882); 'The Dignity of Labor' 1893); 'An Old Family' (1899).

SETON, a skein of silk, cotton, etc., passed under the true skin and the cellular tissue beneath, in order to maintain an artificial issue. The name, which is derived from the Latin *sæta,* a bristle, stiff coarse hair, because hair was originally used for the purpose, is also given to the issue itself. To insert a seton the surgeon takes a fold of the skin between his fingers and makes an incision at the base either with a knife or with a seton needle. In the former case the seton must be inserted by means of a probe, but when a seton-needle is used that instrument carries the seton along with it. When the seton is inserted the wound

is not very tightly bandaged and allowed to remain untouched until suppuration has set in, usually the third or fourth day. After that the wound is dressed with fresh linen regularly once or twice a day, and when the seton has became hard and stiff a new one is inserted by attaching one end of the new one to one end of the old, and then extracting the latter, so that the fresh one is dragged into its place.

SETON HALL COLLEGE, in South Orange, N. J., founded in 1856 by James Roosevelt Bayley (q.v.), then bishop of Newark. It was originally in Madison, N. J., but was removed to South Orange in 1860. In 1861 it was incorporated by the legislature of New Jersey. It was named in memory of Ann Elizabeth Seton (q.v.). The first president was Bernard J. McQuaid, later bishop of Rochester, and the second Michael A. Corrigan (q.v.), afterward archbishop of New York. In 1865 the college building was enlarged, and on 27 Jan. 1866 the beautiful marble edifice was destroyed by fire. It was rebuilt and ready for occupancy in 1867. The college grounds contain 75 acres and the number of buildings is nine. The government is vested in a board of 13 trustees, of which the bishop of Newark is a member and president ex-officio. There are two courses of study, the classical and scientific. The classical course leads to the degree of bachelor of arts; the scientific course to bachelor of science. The courses of study are registered by the board of regents of the University of New York State, hence the students graduating may have entrance to the professional schools of New York. A high school, preparatory for the college, is maintained in connection with the college. Courses of lectures on literary and scientific subjects are established for the pupils, and the public is admitted free of charge. The library, which is in a building of its own, contains approximately 40,000 volumes. The college offers three full scholarships in the classical course, granted to worthy applicants by a competitive examination; they entitle the holders to board and tuition until graduated, and there is a fund to assist worthy students. The annual income is over $90,000. The faculty numbers 20 instructors and the average annual attendance of students reaches nearly 300.

SETTER, a breed of dogs, named from their former habit of crouching or "setting," on observing the game which they are trained to hunt. In modern days, however, these dogs remain erect on coming up with the quarry, and point their nose at it as does the pointer. For the "points" of the various kinds of American setters, see Dog.

SETTIGNANO, sät-tēn-yä'nō, **Desiderio da.** See Desiderio da Settignano.

SETTLEMENTS, Social. See Social and University Settlements.

SETTLERS AND DEFENDERS OF AMERICA, The, an association organized in 1899 to stimulate geographical, biographical and historical research, to publish patriotic manuscripts and records and to collect colonial and Revolutionary relics. The general offices of the society are in New York.

SEVANGA, syĕ-vän'ga. See Gokcha, a lake.

SEVEN, a number regarded by many nations as especially sacred, mystical and symbolical. In the Bible the work of creation having been completed in six days, the Creator rested on the seventh. The three *Regalim* or pilgrim festival of the Hebrews (the Passover, the Festival of Weeks and the Feast of the Tabernacles) lasted each seven days, and between Passover and the Festival of Weeks was an interval of seven weeks. Egypt's seven years of plenty are succeeded by seven years of dearth; for seven days the waters of Egypt were turned into blood. The seventh year was a sabbatical year and the year following seven weeks of years was the year of jubilee. The golden candlestick in Solomon's temple had seven lamps. In the New Testament occur many groups of seven, as, the seven churches of Asia, seven stars, seven trumpets, seven spirits, the seven horns and seven eyes of the lamb; all these in the Apocalypse. Among the Greeks the number seven was sacred to Apollo and to Dionysos; and it held a conspicuous place in the teaching of Pythagoras, who gave it many distinctive appellations. The sacraments of the Roman Catholic Church are seven, and also the orders of the ministry in the same church, namely, four minor and three major or sacred orders. Various reasons have been given for the peculiar regard had for this number, such as that seven is a symbol of completeness, being compounded of three and four, perfect numbers, they being representable in space by the triangle and the square.

SEVEN CHAMPIONS OF CHRISTENDOM, The, a romance of chivalry, by Richard Johnson, entered on the 'Stationers' Register' in 1596. A second part appeared in 1608 and a third in 1616. In it are recounted the exploits of Saint George of England, Saint Denis of France, Saint James of Spain, Saint Anthony of Italy, Saint Andrew of Scotland, Saint Patrick of Ireland and Saint David of Wales.

SEVEN CHURCHES OF ASIA, The, a collective name applied to the churches of Ephesus, Smyrna, Pergamos, Thyatira, Sardis, Philadelphia and Laodicea (Rev. i, 11).

SEVEN CITIES, The, a name applied to Egypt, Jerusalem, Babylon, Athens, Rome, Constantinople and either London or Paris. They are often grouped under this title, as embodying wealth, antiquity, greatness and magnificence.

SEVEN DAYS' BATTLES, a series of battles which began 25 June 1862 by the advance of a part of General McClellan's army, with a view to securing a more advantageous position for a general advance upon Richmond. McClellan's army, numbering 92,500 men, was within a few miles of the city, which was defended by General Lee with an army, including Jackson's command, of 80,762 men. The advance brought on the battle of Oak Grove (q.v.), in which the loss was moderate and with no particular advantage to either side. On the next day McClellan was thrown upon the defensive by the approach of "Stonewall" Jackson toward his right flank beyond the Chickahominy and by Lee's movement upon it. Lee threw the three strong divisions of A. P. Hill, Longstreet and D. H. Hill across the Chickahominy to co-operate with Jackson, but,

without waiting for him to get up, attacked General McCall's division of Pennsylvania Reserves at Mechanicville and Beaver Dam Creek, and was finally repulsed with great loss. On the 27th McCall was withdrawn, Jackson made conection with Lee and the combined Confederate forces attacked Fitz-John Porter's corps and McCall's division, later reinforced by Slocum's division, at Gaines' Mill (q.v.), the result being a bad defeat for the Union forces, Lee's losses, however, in killed and wounded, being about double that of Porter. Porter retreated across the Chickahominy and McClellan started on his retreat or change of base to James River. Lee pursued, and on the 29th fought the two battles of Peach Orchard and Savage Station (qq.v.), both of which were drawn battles, although in both cases the Union troops withdrew from the field to continue the retreat which they had successfully covered. On the 30th, part of the Union army and nearly all Lee's army fought the bloody battle of Glendale (q.v.), the Union army holding the ground until after dark, covering the passage of the trains and defeating all of Lee's persistent efforts to break and destroy it. The last of the seven days' battles was fought at Malvern Hill (q.v.) 1 July, resulting in a bloody repulse for Lee, and that night the Army of the Potomac withdrew to Harrison's Landing on James River. "General Lee's plans in the Seven Days' fight," says General Longstreet, "were excellent, but were poorly executed." In an official report General Lee says: "Under ordinary circumstances the Federal army should have been destroyed." That it was not destroyed is due to the skill of McClellan in conducting the retreat, but more to the fighting quality of his subordinate officers and their men. The Union loss (25 June to 1 July) was 1,734 killed, 8,062 wounded and 6,053 captured or missing. The Confederate loss was 3,478 killed, 16,261 wounded and 875 captured or missing. See Peninsula Campaign of 1862.

SEVEN GIFTS OF THE HOLY GHOST: Wisdom, understanding, counsel, fortitude, knowledge, piety and the fear of the Lord. They are enumerated in Isaiah xi, 2, as rendered in the Septuagint, the Latin Vulgate and their versions: in the Douai English version the passage reads: "The Spirit of the Lord will rest upon him; the spirit of wisdom and understanding, the spirit of counsel and strength, the spirit of knowledge and piety, and the spirit of the fear of the Lord will fill him." With this the Authorized Version agrees save that after "knowledge," this only follows "and of the fear of the Lord"; and the Hebrew, too, has nothing answering to "piety."

SEVEN-HILLED CITY, a name applied to Rome.

SEVEN HUNTERS, The. See Flannan Islands.

SEVEN LAMPS OF ARCHITECTURE, The, a treatise on architecture by John Ruskin, published in 1847. In this book architecture is regarded as the revealing medium or lamp, through which flame a people's passions and which embodies their life, history and religious faith, in temple, palace and home. The first lamp is "Sacrifice," next comes the "Lamp of Truth," the third and fourth lamps are those of "Power" and "Beauty." The fifth is the "Lamp of Life," and the last two lamps are those of "Memory" and "Obedience." Ruskin affirms that "the architecture of a nation is great only when it is universal and established in its language, and when provincial differences in style are nothing more than so many dialects."

SEVEN PINES, Battle of. See Fair Oaks, Battle of.

SEVEN SAGES. See Seven Wise Men.

SEVEN SEAS, The, by Rudyard Kipling, a collection of verse containing several of the author's most vigorous and characteristic poems, was originally published as a separate volume in November 1896. It has also been included, under the same name as a subtitle, in a larger and more comprehensive collection, entitled 'Verses.' While 'The Seven Seas' is not limited in range, containing, as it does, poems on many themes — virile songs in stirring rhythms, such as 'The Last Chantey,' striking character portraits like that of the grim old shipowner of *The Mary Gloster* and of 'the dour Scots engineer' of 'McAndrew's Hymn' and 'The Last Rhyme of True Thomas' and other lyrics and ballads of a high order — still, the dominant note, sounded especially in 'A Song of the English,' is a fervent, almost religious belief in Britain's world supremacy — what Paul Elmer More calls the poet's "earnest conviction that the English race, 'the Sons of the Blood,' are destined to sweep over the earth and fulfill the law of order and civilization." It was this note that caused the poet to be hailed the unofficial laureate of the British Empire. Kipling's frequent use of colloquialisms and slang, however appropriate when his speakers are such careless folk as soldiers and sailors, have led some critics to disparage his claims to the laurel. Yet his eager revelation of the charm and beauty inherent in "things as they are," is precisely what endears him the most. As Charles Eliot Norton says: "The poet finds to-day as entertaining as any day that ever dawned, and man's life as interesting and as romantic as it ever was in old times. . . . It is enough now gratefully to recognize that he continues the succession of royal English poets, and to pay him the homage which is his due."

Arthur Guiterman.

SEVEN SLEEPERS, a Christian legend dating from the times of persecution under the empire. According to the story, in the reign of Emperor Decius, when the Christians were persecuted, it is said that seven noble youths of Ephesus concealed themselves in a neighboring cavern, the entrance of which was closed by order of the emperor. The persecuted youths immediately fell into a deep slumber, from which they were accidentally awakened in the reign of Theodosius II, after the lapse of about two centuries. Pressed with hunger after their long fast, they sent one of their number to the city to purchase bread. He was astonished to see crosses erected all over the city and his own antiquated dress and obsolete language confounded the baker, to whom he offered an old medal in payment for bread. Suspected of having found a secret treasure, he was carried before the judge, to whom he related his miraculous story. The bishop of Ephesus, the magistrates and the emperor him-

self, hastened to the cave and found the sleepers still bearing the bloom of youth. They related their story to the multitudes, gave them their benediction and expired.

SEVEN STARS. See PLEIADES.

SEVEN-UP, a game of cards, sometimes called "all fours" from the four points (high, low, jack and game) that are at stake.

SEVEN WEEKS' WAR, the Austro-Prussian War of 1866, which grew indirectly out of the long-continued rivalry of the Prussian and Austrian nations and was finally precipitated by the Schleswig-Holstein controversy. Prussia's support came from the majority of North German states and from Italy, while the South German states and Nassau, Frankfort, Hanover, etc., gave their assistance to Austria. Under Moltke the Prussians won victories in rapid succession, and in an astonishingly short period had outfought the Austrians, who met their final defeat in the battle of Königgrätz or Sadowa, 3 July after only about seven weeks of actual fighting. The negotiations at Nikolsburg, 26 July, were confirmed by the Peace of Prague and other acts of formal settlement, and the prestige of Prussia, greatly increased, was made dominant in the Franco-German War which soon followed. See AUSTRIA-HUNGARY; GERMANY; PRUSSIA.

SEVEN WISE MASTERS, a collection of tales which originated in the East. The plot connecting the tales is the following: A king's son, who had been instructed in all branches of knowledge by seven wise masters, finds by the study of the stars that he is in danger of meeting his death if he utters a word within seven days. At the very beginning of this period his stepmother urges her husband to put his son to death, at the same time telling him a story calculated to induce him to do so. The king is just about to act on this advice when one of the seven wise masters obtains a day's respite for the prince by telling a tale, the moral of which counteracts that of the stepmother. On each of the following six days during which the prince's danger binds him to silence, the stepmother renews her solicitations to the king to have the prince put to death, on each occasion supporting her advice by a fresh story, but the effect of the stepmother's tales is always counteracted by another told by one of the seven wise masters, until the expiration of the seven days enables the prince to reveal the designs of his stepmother. The date and circumstances of the origin of this collection of tales are unknown. The plot of the work is in fact found in Buddhist literature, not as a fable but as a real event, but no Indian original of the collection of tales has been discovered. The tales were without doubt introduced into the West through the Crusades, since which the collection has been translated into almost all Western languages.

SEVEN WISE MEN, or **SEVEN SAGES, OF GREECE,** the collective designation of seven ancient philosophers and sages, namely, Solon of Athens, Thales of Miletus, Pittacus of Mitylene, Bias of Priene, Chilon of Sparta, Cleobulus of Lindus and Periander of Corinth; they all lived between 620 and 548 B.C.

SEVEN WONDERS OF THE WORLD. Within the sovereignty of Turkish soil, as it stood at the beginning of the European War of 1914, were included six of the original Wonders of the World, about which so much has been written, until it is hard to distinguish between history and fable. The exception was the Colossus of Rhodes which stood on Greek territory. Of all these wonderful creations only two survive and in a more or less damaged state — the vocal Memnon and the Pyramids. The former term is applied to one of the two colossal statues, each nearly 70 feet high, of Amenophis III, near Thebes, two of which still remain. In the case of the more northerly of these, partly overthrown by an earthquake (27 B.C.), it was noticed that at early morn it gave forth a curious sound, resembling a cry, which was supposed to be the response of Memnon, son of the Dawn or Eos, to his mother, and formed the subject of varied interpretation by ancient sages and modern writers in folklore. But early travelers, who heard the sound, never solved the mystery, which was simple enough — it was merely the passage of air through the pores of the broken reddish sandstone, due to the change of temperature at sunrise. Not the first or last of ancient miracles to be as easily solved after ages of wonderment. But the musical sounds are no longer heard since Septimus Severus repaired the breach in the sandstone. More useful was the second wonder — the lighthouse or Pharos, built by Ptolemy Philadelphus (200 B.C.). It was erected on a long narrow rock in the harbor of Alexandria, a mile off shore, and was inscribed "King Ptolemy to the gods, the saviors, for the benefit of sailors." Many traditional details of doubtful authenticity have come down to us as to its height, surpassing the loftiest of pyramids, the mirrors employed as reflectors, the fire kept burning nightly at its top, and the architect's scheme for immortalizing his name by cutting it in the structure and covering the huge letters with plaster. Long before our modern school gardens, Nebuchadnezzar reared the Hanging Gardens of Babylon for his wife's pleasure. They consisted of a series of five terraces of sun-dried brick and were raised each 50 feet above the other, to the height of 250 feet. The labor of thousands of slaves was conscripted in its construction. A winding stair led to the queen's paradise on top, the terraces were exquisite gardens with the rarest and most beautiful plants. There were flowery fountains, tame animals disported at ease through the meadows, and the structure became one of the ancient world's wonders. Next comes the magnificent Temple of Diana at Ephesus, scene of orgies as well as of worship, and set on fire by Erathosthenes, who sought thereby to gain renown. Rebuilt by the Ephesians, after declining Alexander's aid, it surpassed the glories of the original fane, with its main altar by Praxiteles, its columns of porticoes 60 feet in height, its length 405, its width 220 feet, all of white marble, elaborately adorned with gold and filled with statues and works of art. First despoiled by Nero, it was destroyed by the Goths. A widow's tender thought of her husband supplied one of the wonders. Upon the death of Mausolus, king of Caria, his widow, who died of grief 350 B.C., built his tomb, which must have been of rare magnificence to have given its name Mausoleum to ornate graves of the dead to our day.

The pyramids of Egypt still survive as wonders. These tombs of the Pharaohs, marred by age and partly destroyed by earthquakes, arouse no less wonderment, while countless volumes have been written on their origin and history, with curious speculation as to the uses for which they were designed. The masonry of the great Pyramid of Cheops, as it is termed, has been worn out at top by time, and the sides, which once were smoothly slanting, now form a series of steps, due also to time and the elements. The legend of the Colossus straddling the harbor of Rhodes with its legs, is very picturesque but it had no other basis than popular fancy. It was in reality a huge bronze image of Apollo, about the height of New York's Statue of Liberty, 105 feet. Erected about 200 B.C. on the shore at the entrance to the harbor of Rhodes, it was overthrown by an earthquake, its fragments in later decades being bought and carried away on camels by traders of the time, ready as today to barter in junk. How many modern wonders of art, science and invention are likely to survive a thousand years and more, when fame to-day is as rapidly lost as it is acquired and miracles of achievement occur so often that they have ceased to be miracles?

SEVEN YEARS' WAR, a war between Prussia and other European powers (1756–63). By the treaties of peace concluded at Breslau 28 July 1742, and at Dresden 25 Dec. 1745, Maria Theresa of Austria ceded to King Frederick II six principalities of Silesia and the county of Glatz. In the hope of recovering them she concluded an alliance with Elizabeth, empress of Russia, brought over to her cause the king of Poland and elector of Saxony, Augustus III, and attempted to form a closer union with France. Meanwhile a dispute had arisen between Great Britain and France relating to their American boundary, and it broke out in 1755 into open hostilities. The king of England concluded an alliance with Prussia; and some months after France made a league with the court of Vienna. All the proceedings of the Russian, Austrian and Saxon courts were discovered to Frederick, who resolved to anticipate his enemies. In August 1756, he invaded Saxony, occupied the capital, which had been deserted by the court, Leipzig, Wittenberg and Dresden; took possession of the documents necessary to justify his conduct which he found in the archives of the cabinet in the last city, and invested the Saxon army in their fortified camp at Pirna. Meanwhile Field-Marshal Browne advanced from Bohemia with an army to liberate Saxony; but Frederick was able to check his advance, and the Saxons, 14,000 strong, were forced to surrender 15 October. The inferior officers and common soldiers were compelled to enter the Prussian service; but they soon deserted, making their escape to Poland, where the Saxon court resided during the whole war. Such was the end of the first campaign, and the Prussians remained through the winter in Saxony and Silesia. Frederick's invasion of Saxony was pronounced to be a violation of the Treaty of Westphalia, and France, as one of the guarantors of that treaty, now took part in the struggle. Sweden and Russia adopted a similar course. In the diet at Ratisbon, held in January 1757, war was also declared on the part of the empire against Prussia.

Thus in 1757 Austria, Russia, France, Sweden and the German empire were in arms against Frederick, while he had no ally but England and a few German states (Brunswick, Hesse-Cassel and Gotha, besides, of course, Hanover). In order to be again beforehand with his enemies, Frederick (April 1757) marched into Bohemia, and on the 6th of May a bloody battle was fought at Prague, in which the Prussians conquered, but lost their distinguished general, Schwerin. The greatest part of the vanquished Austrian army threw itself into the city of Prague, to which the king immediately laid siege. But the defeat of Frederick by the Austrians under Daun, at Kollin, in the following month, 18 June, deprived the former of all his advantages. He was forced to raise the siege of Prague, and to retreat to Saxony and Lusatia. Little more than a month later, 26 July, the Duke of Cumberland, commanding the German allies of Frederick, was defeated at Hastenbeck on the Weser, in the south of Hanover, by the more numerous army of the French; whereupon the victors made preparations for taking up winter quarters with the imperial army in Saxony. The two armies had already united and advanced as far as the Saale, the French under the command of the incapable Prince Soubise, a favorite of the Marquise de Pompadour, when Frederick marched against them, and fought at Rossbach, a village between Merseburg and Weissenfels, that memorable battle, in which both the French and the imperial armies were defeated, and found safety only in a hasty flight 5 November. The defeated armies retired into winter quarters at a distance, and the possession of Saxony was secured to the king. Upon this Frederick hurried back to Silesia, which was now occupied by the Austrians. With a small army, fatigued with a long march, he defeated at Leuthen a force twice as great, under Daun, 5 December. By this victory Frederick recovered Silesia, and he was now more formidable to his foes than ever; for not only had he been victorious himself, but while he had been thus occupied in the south and west his general Lehwald had successfully repelled the Swedes and Russians on the north and east.

The third campaign was opened in February 1758, by Ferdinand, Duke of Brunswick, who was now at the head of the allied armies, in the place of the Duke of Cumberland, and opposed the French in Lower Saxony and Westphalia. His nephew, the hereditary prince, afterward Duke of Brunswick, Charles William Ferdinand, commanded under him. Duke Ferdinand made himself master of the Weser, expelled the French, under Clermont, from Lower Saxony and Westphalia, and defeated them 23 June at Krefeld. He then returned over the Rhine to Hesse, where Soubise was stationed with a French army, and whither Clermont followed him. Ferdinand, in the meanwhile strengthened by 12,000 British troops, forced the two hostile bodies to retire over the Main and the Rhine, where they went into winter quarters. Mean-

while the Russians, under Bestucheff, had advanced as far as the Oder; and subsequently Fermor, who superseded Bestucheff, occupied east Prussia, and then moved into Brandenburg, spreading devastation on his way. At this juncture Frederick made a masterly march to the Oder, and toward the end of August engaged the Russians at Zorndorf, in the north of Brandenburg, where he gained a sanguinary victory, which forced the Russians to retreat to Poland. After this he again turned his attention to Saxony, where his brother Prince Henry was no longer able to resist the Austrians. He encamped at Hochkirch, but here he was surprised by Daun in the night of 14 October and suffered a total defeat. He nevertheless succeeded with the remains of his army in effecting a junction with his brother, after which he again drove the enemy out of Silesia and Saxony. At the close of the campaign the king saw all his dominions except Prussia proper free from the enemy. In France there was a general wish for peace; but Louis XV and his mistress, the Marchioness de Pompadour, were bent on continuing the war. A new alliance was therefore concluded with Austria 30 Dec. 1758. Frederick, however, had also obtained a new treaty with Great Britain, which promised him a large yearly subsidy. Yet he determined in the coming campaign to act with his main army as much as possible on the defensive and to commit aggressive movements to detached corps.

The campaign was opened in March 1759, Prince Henry marching into Bohemia, where he dispersed the hostile forces, and captured immense quantities of military stores. He then entered Franconia, and put the inactive imperial forces to flight. At the same time the Prussian general Dohna drove back the Swedes once more to Stralsund, and managed to keep the Russians for a time in check. But when the Russians pressed forward in ever-increasing numbers under Soltikoff, Dohna found himself obliged to give way. Frederick then gave his command to General Wedel, who received orders to prevent the junction between the Russians and Austrians at all costs, and accordingly on 23 July attacked the Russians at Kay, near Züllichau, in the east of Brandenburg. His attack was unsuccessful, and the Russians after their victory advanced to Frankfort-on-the-Oder. Frederick now hastened in person to his electoral dominions, and on 12 August attacked the Russians at Kunersdorf, near Frankfort, and had already defeated them when the victory was snatched from him by the Austrians, under Laudon, who inflicted on him a defeat such as he had never before sustained. The Russians purchased their victory dearly, and they made no use of it. Yet Frederick's position was extremely dangerous; indeed, he began to apprehend an unfortunate issue of the war. The Russians were victorious in his hereditary states; Daun was in Lusatia with a large army, and Saxony was overrun by the imperial troops. The Austrians and Russians wished to unite, but Prince Henry deprived the former of their magazines, and thus obliged them to retreat; and Frederick anticipated the Russians in their march to Silesia, and compelled them to retire to Poland. In the west Frederick's allies had been more successful. They had, indeed, been able to do but little at the beginning of the campaign. The French had taken Frankfort-on-the-Main by surprise during the winter, and the plan for recovering the city was frustrated by the failure of the attack on Bergen 13 April. But 1 August, Ferdinand gained a decisive victory at Minden over the French troops under Contades and Broglio. On the same day the hereditary Prince of Brunswick likewise defeated the French at Gohfeld, and they were driven over the Lahn on one side and over the Rhine on the other. The Swedes also, who, after the battle of Kunersdorf, when Prussian Pomerania was destitute of troops, invaded that country, were driven by Manteuffel and Platen under the cannon of Stralsund. Thus, in spite of all his mishaps, Frederick's fortunes were still in the ascendant at the end of the campaign.

The campaign of 1760 seemed at first to forbode ill success to Frederick. While he himself was engaged in Saxony, the brave General Fouqué suffered a defeat in Silesia, in consequence of which the Austrians occupied the whole land. Frederick thereupon gave up Saxony in order to recover Silesia. With 30,000 Prussians he marched into that province, and intrenched himself at Liegnitz. Here on 15 August he defeated Laudon, and thereby effected his purpose of recovering Silesia, but he was unable to prevent Austrian and Russian troops from breaking into Brandenburg and laying waste his hereditary dominions. Frederick hastened thither to cut off the enemy, but not finding them there he returned to Saxony, where the imperial forces were stationed, and Daun and Lascy had united. At Torgau, on the Elbe, he attacked the enemy 3 November, defeated them in a bloody engagement, and then went into winter quarters in Saxony. The Russians were also forced to raise the siege of Colberg and to retire to Poland. The allied forces, under Ferdinand of Brunswick, defeated the French 31 July at Marburg; but the latter remained in Hesse.

In the opening of the next campaign 11 Feb. 1761 Ferdinand attacked the French in their quarters; they fled, losing many of their fortifications and magazines. A corps of French and Saxon troops was defeated 14 February at Langensalza; but the allies were obliged to raise the siege of Ziegenhain, Marburg and Cassel with loss, and the French once more became masters of all Hesse, and had an unobstructed passage to Hanover. The proposals of peace now made by Britain and Prussia were not accepted, and Frederick endeavored to protect Silesia against the Austrians and Russians, who had united in August at Striegau. He and his allies, however, met with reverses at Schweidnitz, Colberg and elsewhere, and despite some successes (as at Villingshausen) Frederick felt himself in a desperate condition. But at the very time when Frederick's distress was greatest, Elizabeth, the empress of Russia, died 5 Jan. 1762, and her successor, Peter III, concluded with him 5 May the Peace of Saint Petersburg. Sweden likewise made peace with Prussia, and the Russian emperor sent a body of troops to aid the Prussians. But the emperor's early death broke the alliance with Frederick, and his successor, Catharine II, recalled the Russian troops from the Prussian service. Frederick, however, was delivered from one dangerous enemy, and had gained an important preponderance of strength over the rest. After recovering Schweidnitz and providing for the defense of Silesia, he marched to Saxony. On 29 October an important victory was gained over the Austrian and imperial troops at Freiberg, and the king now concluded an armistice with the Austrians; but it related only to Saxony and Silesia. Under Duke Ferdinand and the hereditary prince of Brunswick the allies then began unsuccessfully, the campaign of 1762 against the French; but the latter were defeated 24 June at Wilhelmsthal, and driven from their fortified camp at Cassel. Cassel itself was besieged, and 1 November surrendered to the allies. Two days after this the preliminaries of peace between Britain and France were signed, and the peace itself was confirmed at Paris 10 Feb. 1763. After a short negotiation Frederick concluded a peace with Austria and Saxony at Hubertsburg, 15 February, by which each power received again all the territories it had possessed before the war. The simultaneous struggle between Great Britain and France in North America and India ended in favor of the former. See CANADA; FREDERICK II; MARIA THERESA; PITT, WILLIAM.

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SEVENTEEN-YEAR LOCUST, or **CICADA.** This insect (*Cicada septendecim*) is black, marked with bright orange and a white spot on the head just behind the eyes. There are four glassy wings and the eyes are red. The length is about one and one-half inches. When the insect emerges from the ground after its 17 years' burial it ascends a tree trunk or other convenient object and works its body rapidly backward and forward, breaking the pupal skin, from which the winged imago emerges. The cicadas pair at once. They then congregate on the branches of the trees in sufficient numbers to bend and at times break them by their weight. The woods and orchards resound with the din of the drums from morning to night.

The females lay the eggs in the twigs and small branches of trees. They repeatedly thrust the ovipositor obliquely into the bark and wood in the direction of the fibres, at the same time putting in motion the lateral saws which detach little splinters of wood and make a fibrous lid over the whole. In each fissure made by the piercer the female deposits from 10 to 20 eggs in pairs. It takes her a quarter of an hour to prepare one nest and fill it with eggs, and she usually makes between 15 to 20 fissures in one limb. She lays between 400 and 500 eggs and then soon dies. Six weeks later the eggs hatch. The young when it bursts the shell is grublike in form and has six legs, the first pair of which are large and claw-like, and the mouth is provided with a suctorial proboscis. After being hatched the young deliberately loosen their hold on the limb and fall to the earth. They instantly dig their way into the ground where they seek out the tender roots of plants. These they pierce with their beaks and draw out the vegetable juices which constitute their sole nourishment. They remain in the larval state for about 17 years, when they are full grown, pass into the pupal state, in which they remain but a few days, seek the surface of the ground and transform.

When a brood of cicadas is expected, no young trees should be set out for a year or two prior. The older trees are frequently able by their strength to live through the attacks. Extremely valuable shrubs and trees may be saved by being completely covered with mosquito netting, thus preventing the deposit of eggs.

For a record of broods, see CICADA; and for the musical apparatus, etc., see ORTHOPIERA.

SEVENTH DAY ADVENTISTS. See ADVENTISTS.

SEVENTEENTH CENTURY. This was a century of bitter political dissension, religious wars and ever-recurring turmoil of many kinds throughout Europe. The Huguenot wars in France during the first 30 years, the Thirty Years' War in Germany (1618–48) and the frequent wars of France with nearly all her neighbors under Louis XIV in the latter half of the century make it forever notorious. England put King Charles I to death (1649), was ruled by Cromwell for some 10 years, restored the Stuarts (1660) only to banish them in the person of James II (1688) when his Catholicity offended the realm, so as to place his Protestant daughter Mary, with her consort, Prince William of Orange, on the throne. This furnished the occasion for the drawing up of the Declaration of Rights, which the king and queen as all subsequent English sovereigns had to guarantee before their coronation, so that the Revolution of 1688 well deserves its title of «glorious» as a landmark in the progress of constitutional government.

The romantic career of Sir Walter Raleigh (1552–1618) closed tragically. As a favorite of Queen Elizabeth he went on expeditions to America, tried to found a colony in Virginia, named by him after the «virgin queen,» and was one of the gentlemen adventurers of the later 16th century, well known by everyone. He lost favor in King James' time, was accused of taking part in a conspiracy against the king, for which he was imprisoned in the Tower for some 13 years, and finally, having failed in an expedition to America, was beheaded. During his long confinement he relieved the tedium of prison life by writing a 'History of the World,' of no value as history, but an interesting example of the prose and mode of thought of the time. Raleigh will always be remembered for having introduced the potato into Ireland and the use of tobacco into England. The use of tobacco was condemned by Church and State and bitterly denounced by King James I, who wrote a book against it, but spread all the faster, apparently, for that. It was supposed to be the secret of the health and vigor of the

Indians, the significance of their life in the open and their simple food being missed. Tobacco was destined to become the most popular of narcotics, almost universal in use. Only the American Indians used it in the 15th century; now it is used everywhere throughout civilization. This century saw also the introduction of coffee into Europe as well as of tea. Coffee houses became popular social centres, and tea was served in them in the latter half of the century with and without alcoholic additions. The two exotic plants and their products were destined to revolutionize social usages in many ways, and their use has gone on increasing in spite of medical and other warnings with regard to possible dangers.

The Jacobean period, named after James I (king 1603–28), who had been James VI of Scotland, the son of Mary Queen of Scots, contains Shakespeare's mature work — 'Hamlet,' the Roman plays, 'Lear,' 'Macbeth' and 'Henry VIII' — a number of the plays of Ben Jonson, besides all of the dramatic product of Beaumont and Fletcher and Massinger, with most of the work of Shirley and Davenant. The latter part of the century had Dryden, Congreve and Wycherley. The Jacobean was followed by a period of Puritan literature, the supreme products of which are Milton's 'Paradise Lost,' the greatest epic in English, and Bunyan's 'Pilgrim's Progress,' the greatest English allegory, both with a high place in world literature. Milton succeeded admirably in his revival of the classic drama in 'Samson Agonistes,' but it is his shorter poems that reveal his greatness as a poet. Bunyan, a wandering tinker, confined to Bedford jail for 12 years, found the time to write his allegory, a marvelous bit of English prose and of Puritanic philosophy. He was so full of the Scriptures that his book breathes their very style. The subsequent reaction against Puritanism gave rise to the licentious Restoration drama. Even Dryden allowed his work to be tinged by the license of the time. His poetry is the greatest of the period and perhaps the greatest for two centuries after.

After Shakespeare's plays, the most important landmark in English literature of this century is the King James version of the Bible (1611). Done by a group of scholars into the virile English of the time, under the influence of the still living Elizabethan tradition, this translation fixed the language, prose and verse, for all the after time. It has had the strongest influence on nearly all the English writers, though more particularly writers of prose, and still remains what may be called the best English.

The man of the period most famous in the aftertime was Lord Bacon (Baron Verulam), Lord Chancellor of England. His 'Novum Organum' with its discussion of the inductive method brought him fame. It is recognized now that he was only one of a group of men about this time, many before him, who emphasized the value of induction in science. Some of the greatest discoveries of our modern sciences were made by the inductive method before and after Bacon's time by men who knew nothing of Bacon. Telesio stated fully the inductive method 100 years before Bacon; his great namesake Roger Bacon, as well as Albertus Magnus, Nicholas of Cusa and many others employed it before the Middle Ages closed, and Copernicus Versalius, Eustachius, Leonardo da Vinci, Cæsalpinus and many others had used the method of observation and experiment in the 16th century, and Gilbert and Galileo, Bacon's contemporaries, used it very successfully but quite independent of his influence. Bacon's modern fame is founded on the claim that he was the author of Shakespeare's plays. This "Baconian theory," as it is called, owes its vogue to one Delia Bacon, who claimed to be a descendant of the Lord Chancellor, and who first made the claim for him some 250 years after Shakespeare's death. The year after she was adjudged insane and never afterward recovered her sanity. The theory was not an invention of hers, as the curious delusions of the insane seldom are, but the chance suggestion of a writer on travel in Mexico who threw out the hint that it must have been a learned man who wrote Shakespeare's plays.

The literature of the century opened with Shakespeare's 'Hamlet,' "more written about than any man that ever lived" (Furness) and 'Don Quixote,' "incomparably the best novel ever written" (Macaulay). The Spanish promise was well fulfilled. Cervantes' short stories have been declared the best of their kind. Spain excelled, however, in dramatic literature. Calderon has been compared to Shakespeare (Russel Lowell). Lope de Vega (1560–1635), "a prodigy of nature," wrote more plays than any other man that ever lived. His plots at least deeply influenced writers in other countries. Alarcon, an American by birth, and Tirso de Molina, the creator of the world-type Don Juan, whose biography has been re-created in our day, for he wrote under a pseudonym, are other Spanish dramatic writers with a place in world literature. In history (Mariana), in philosophy (Suarez), in ascetics (Rodriguez) as well as in theology (Molina) and grammar (Alvarez), the Spanish writers of this period, are famous and their works have been republished many times.

The century contains the "Golden Period" of French literature. Richelieu founded the French Academy (1635), and this gave a great impetus to the cultivation of the French language. Louis XIV was most liberal in his patronage of Frenchmen of letters, and his was a real Augustan Age, with a great many of the literary men of the time ready to sing the praises of the king because of his generous patronage. The political glory of Louis' reign and the many French victories in war stimulated the French imagination with magnificent literary results. France's crowning prestige in this period made the French literature of very far-reaching influence. Latin gradually ceased at this time to be used as a common language in diplomatic and scientific circles. French replaced it, so that everyone in Europe who had any pretensions to education knew French besides his mother tongue, and was interested in French literature. It is not surprising, then, that under the stimulus of a world audience every mode of French literature developed in wonderful fashion. Corneille, Racine and Molière are the great dramatic poets, worthy of a place beside the dramatists of any other time or country; Descartes and Pascal, the philosophical writers who have deeply influenced all the succeeding generations; Boileau and La Fontaine the poets, still widely read after nearly three centuries; Bossuet, Bourdaloue and Flechier the orators, among the greatest of history; La Rochefoucauld and La Bruyère as moralists are still living forces, and La Rochefoucauld is almost more quoted than any author since his time. Fenelon has a place by himself and it is very high. The period also saw the development of a school of romance, mainly of women writers. Madame de Sévigné wrote French prose while coteries of immortal French literary ladies made literature a fashion, though little of their work has survived. Mademoiselle de Scudéry's writings had an immense vogue and probably suggested the comic romance of Scarron and some other romantic developments. Madame de la Fayette wrote in the 'Princess of Treves,' a story that anticipates our modern fiction in many ways.

Three philosophers who have notably affected human thinking ever since wrote at that time. Descartes (1596–1650), who probably has influenced modern philosophy more deeply than any other, was distinguished as a mathematician, but put that aside to spend 20 years in retirement in Holland (near Leyden) elaborating his system of philosophy. He began by doubting everything, even his own existence, but his "I think, therefore, I am," became for him the foundation of certitude. Spinoza (1632–77) was the greatest modern expounder of Pantheism. He was descended from Portuguese Jews and made his living as a lens-grinder in Amsterdam. His metaphysical speculations were founded on Descartes, who had gone into philosophic retirement not far from where Spinoza also retired when he gave up his occupation to write out his Pantheistic theories. Pascal (1623–62) was like Descartes, first a mathematician and then a philosopher. He is famous for his prose style. He died before his *magnum opus*, an apology for Christianity, was completed. All that we have of it is the 'Pensées,' thoughts on great subjects.

The century proved a great period in the history of mathematics. Kepler succeeded Tycho Brahe as mathematician-astronomer to the Emperor Rudolph (1602). In working out Tycho's observations he deduced the great laws that bear his name. Galileo's discoveries opened further occasions for mathematics. Cassini's tables of the motions of Jupiter's moons led to his invitation to the observatory in Paris, and the Cassinis continued for generations as successful workers in astronomy and mathematics. Descartes and Pascal graduated from mathematics into philosophy and carried the modes of their previous discipline into the new sphere of thought. The Bernoullis, Jacques and Jean were followed in succeeding generations, like the Cassinis, by great mathematicians. Jacques Bernoulli (1654–1705) solved the isoperimetrical problem and discovered the properties of the logarithmic spiral. The two greatest mathematicians of the century are Leibnitz (1646–1716) and Newton (1642–1727). Leibnitz was the inventor of the differential and integral calculus (independently discovered by Newton), and was also a writer of influence on philosophy. Newton's astronomical mathematics, depending on the determination of the length of a degree on the earth's surface by Picard in Paris (1671), made him famous. His 'Principia Mathematica' was presented to the Royal Society (1686) and published the following year.

The name of the period around which ever-recurring controversy has centred is that of Galileo (1564–1642) the physicist-astronomer. He invented the thermometer, discovered the isochronism of the pendulum and the hydrostatic balance and the barometer. His great invention was the telescope, with which he discovered Jupiter's moons (1610). For teaching in opposition to all the mathematicians and astronomers of his time that the Copernican theory is the only tenable doctrine of the heavens though his reasons for it have all since been contradicted, and Copernicanism is now held on entirely other grounds. Galileo was compelled by the Inquisition to abjure his Copernican teaching in 1633. He was disciplined but *not* imprisoned, and prominent ecclesiastics continued to be his friends. "His long life considered as a whole was one of the most serene and enviable in the history of science" (Bertrand, Perpetual Secretary Paris Academy of Science). His trial at Rome has been taken as the symbol of Church opposition to science, but as it is practically the only case in some six centuries, Cardinal Newman emphasized the fact that it had just the opposite significance, and was the exception which proved the rule of Church relations to science as favorable. Galileo himself continued to be a faithful and even devout Catholic.

The century stands out in the history of art, with two of the greatest artists of all time — Rembrandt (1607–69) and Velasquez (1599–1660). Admiration for the work of these men has grown ever since. A series of great painters, besides Rembrandt in the Netherlands and the contemporaries of Velasquez in Spain, are noteworthy. Rubens (1577–1640) did his best work in this century, and his pupil Van Dyke (1599–1641) belongs entirely to it. His greatest work was done in the fourth decade of the century in England. Ruysdael, Hobbema, Paul Potter, Vermeer, Teniers and others maintained the primacy of the Netherlands in painting during this century. Besides Velasquez there were in Spain many who reached distinction and that distinction has grown in recent years. The best known among them are Zurbaran, Murillo and Ribera. In France, though the French were under the influence of the Italians, such names as Nicolas Poussin and Claude (Lorrain) are forever famous.

Sweden came to occupy a very important place in European politics during this century. King Gustav Adolf (Gustavus Adolphus) intervened in the Thirty Years' War to prevent the further aggrandizement of the Hapsburgs. The Swedes looked upon the Baltic as a Swedish lake and their supremacy seemed imperiled. After the fall of Magdeburg, 1631, when that city was stormed by Tilly and given up to pillage, the Protestant princes of Germany, alarmed, united with the Swedish king. Tilly was defeated at Breitenfeld (Leipzig) 1631, and again the following year, when he was fatally wounded. The emperor had to turn to Wallenstein, who had been in disgrace. Under him a

battle was fought with the Swedes at Luetzen in Saxony, which the Swedes won, but at the fatal price of their king. Wallenstein fell under the suspicion of the emperor who caused him to be assassinated (1634). After this the later part of the Thirty Years' War became a political struggle between the house of Bourbon and the house of Austria, though for a time it had seemed to be a war on religious grounds between Catholics and Protestants. The Treaty of Westphalia, which ended the war, established the principles of balance of power in Europe, which has been the source of so much disaffection and so many wars since.

On the death of Gustavus Adolphus, his daughter Christina, but six years old, succeeded under a regency. At the age of 18 she assumed the government, at once concluded the war with Denmark and hastened the conclusion of the Thirty Years' War in Germany. She had the genius of her father but applied it to peace, and all his virtues and some of his faults. She patronized literature and philosophy, brought Descartes to Sweden and tried to bring order out of the chaos at home and abroad. Dissatisfied, she secured the election of her cousin Charles Gustavus as her successor, abdicated in 1654 and embraced the Roman Catholic faith. She settled in Rome, where she became the patroness of letters and science and collected a great library which was afterward incorporated with that of the Vatican.

The beginning of the century saw a series of contradictory movements begin. The Jesuits established their Reductions in Paraguay, where a solution of the social problems of life for savage peoples was probably best presented in history. About the same time the Romanoffs became tsars of Russia to continue absolutism until well on in the 20th century. In 1620 slavery was introduced by the sale of African negroes in Virginia and the Pilgrims landed on Plymouth Rock.

France became the dominant power in Europe during this century. This was largely due to the genius of Richelieu, but also to his almost complete disregard for any law, human or divine, that opposed his ambitions for his country. He intrigued with Protestants when that suited his purpose, was the champion of Catholicism on occasion, oppressed the nation at home and schemed abroad — the type of statesman praised because he put the state above every other consideration. He aimed to make the power of France supreme in Europe and to make the king absolute in France. By intrigue, by diplomacy, by every other means, he succeeded in these ambitious projects. He crushed the Huguenots, suppressed the aristocracy and wiped out the local assemblies and courts with their old privileges. He did not live to see France the leading power of Europe, but his policy carried out, proved successful in the hands of others. When Louis XIII died, his son Louis XIV was but five years of age. He reigned 68 years. It looked as though, under a child ruler, France might lose her prestige, but Cardinal Mazarin continued Richelieu's policies, loading France with the taxes that eventually brought the Revolution in its train, to do so. When Mazarin died, Louis at 23 at once took the government into his own hands. For more than 50 years he was his own Prime Minister and gave attention to every detail. He waged four great wars, three of them in this century — that about the Spanish Netherlands (1657–68), that of the Protestant Netherlands (1672–78), that of the League of Augsburg (1688–97). He succeeded in extending his rule over certain Flemish towns, but his war with Holland proved a failure, the sturdy Dutch cutting the dikes, flooding their country, making the French army useless and driving the French fleet from the seas. Louis seized the free town of Strassburg (1681) without provocation and thus extended his kingdom to the Rhine. He revoked the Edict of Nantes which guaranteed religious freedom to the French Protestants, but only succeeded in depriving France of many worthy citizens, some of whom sought refuge in America to be sturdy upholders of liberty, and others in the Transvaal and the Orange Free State to be the backbone of independence there. A League of Nations was formed against Louis, embracing not only the Protestant countries, of England, Holland and Sweden, but also most of the Catholic powers of Europe, including Spain and the emperor. The war lasted 11 years. The French made important conquests but were unable to hold them and laid them waste. At the end of the war, all parties gave up the territory they had won, though Louis succeeded in retaining Strassburg.

The most interesting character of the century is Oliver Cromwell. The son of a simple country gentleman, educated at Cambridge, he was returned by his university to the Short and Long Parliaments. He became captain of a Parliamentary company of horse in 1642, and then colonel. He organized a regiment which, on account of its invincible courage, was known as the Ironsides. He was a prominent member of the High Court that signed the death warrant of Charles I. His position in the army gave him a controlling voice in the government, and after his expedition to Ireland (1649), he was made commander-in-chief. Later, defeating the Scotch (1651), and expelling the Rump Parliament, he was made Lord Protector of the Commonwealth (1653). He ruled practically alone. He was a benevolent autocrat who labored "to make England great and to make her worthy of greatness." His autocracy was tempered by his manifest desire to rule England in accordance with Scriptural precepts. He had the vindictiveness of the Old Testament deep in his character. His treatment of the Irish put an indelible stain on his memory. Over half a million of them were killed or banished. The best lands of the island were confiscated and granted to English and Scotch settlers. The famous Cromwellian settlement is called the "curse of Cromwell" by the Irish. Disaffection has existed ever since. As Lord Protector, Cromwell ruled firmly and secured the respect of foreign countries and peace and prosperity at home. He made England the leading Protestant country and interposed wherever Protestantism on the Continent needed an ally. He protected the Huguenots, won the Duke of Savoy to stop the persecution of the Vaudois and opposed the political policies of France and Spain except when they might favor Protestantism. Confident that the Pope was responsible for all opposition to Protestantism, he had him informed that unless there was peace, the sound of English guns would be heard in Rome. When he died unexpectedly of influenza (1658), he was succeeded as Lord Protector by his son Richard, timid and without resolution, who yielded to the disaffection of the army and resigned his office the next year. Anarchy seemed in prospect, but General Monk, commander of the army in Scotland, took control and the Long Parliament restored the Stuarts in the person of the son of Charles I. Charles II was received with the heartiest of welcomes. His reign saw a long reaction against the gloomy Puritanism of the preceding generation, during which morality sank to a low ebb, the drama declined, women appeared as actresses and literature became a pander. England suffered severely from plague (1665) and the great fire in London (1666) wiped out most of the town but gave opportunity for reconstruction, with widened streets and created much more healthful conditions. Sir Christopher Wren was put in charge of the reconstruction and built a number of handsome buildings. Great dread existed lest Roman Catholics gain any power in England and the announcement of the discovery of a Popish plot (1678) to kill all Protestants, beginning with the king and Parliament, caused great excitement. Informers came forward to testify and Titus Oates particularly gained notoriety. Many Catholics, convicted on the testimony of perjured witnesses, were condemned. The revulsion of feeling over the injustice done led to the Habeas Corpus Act (1679) which has stood ever since as the safeguard of personal liberty all over the English-speaking world.

The hero of the century is John Sobieski, the brave king of Poland (1629–96). He had risen by merit to the command of the Polish army when Poland was the most important country in central Europe and had been especially successful against the Cossacks and Tartars, encroaching on the frontiers. Later, when the Turks invaded Poland, he won several battles from them and his crowning victory of Chocim cost them 20,000 men and many guns. He became a national hero and was unanimously elected king (1674). His reign was occupied in battling with the Turks. Finding it vain to attack the Poles, the Turks turned against Austria, laid siege to Vienna, from which the Emperor Leopold fled, after imploring Sobieski's help. In spite of political reasons to the contrary and Louis XIV's counsel against it, Sobieski at once went to the rescue and with an army of scarcely more than 75,000 men, defeated some 300,000 Turks and saved Vienna. The victory was largely due to the prestige of Sobieski's name, for the Turks stood their ground until they heard that "The Northern Lion" was on the field, when they lost courage and broke in confusion.

What has been called the political revolution of modern times begins after the peace of Westphalia (1648). For the next century and a half the seeds of political disaffection grew to reach fruition in the French Revolution (1789). The revolutionary spirit was fostered by the frequent wars of the time, so many of them undertaken merely for the benefit of particular reigning families, that the period has been called in history the "era of dynastic wars." The culmination of arbitrary power centred in one man was reached in Louis XIV of France, who may not have used the expression attributed to him often "L'État c'est moi — I am the state," — but his career exemplified that motto. Since Henry VIII's time, the divine right of a monarch in England had become more explicit and was formally claimed by James I and the Stuarts after him. The second half of the 17th century brought with it the beginning of the reaction against this exaggeration of the place of royal authority and thoroughly prepared for the revolutionary movements of the next century.

With the beginning of this century, English America comes into history. The settlement of Jamestown, Virginia (1607); of the Pilgrims in Massachusetts (1620); of the Dutch in New York (1621); of the Swedes in New Jersey (1633); of Lord Baltimore and his colony in Maryland (1634) and of the Quakers in Pennsylvania (1681), are the important events of this period. All of the colonies suffered much from the Indians except Pennsylvania, where William Penn paid them for their land and always treated them fairly. Most of the colonies developed slowly but by the beginning of the 18th century, had begun to show some signs of the power they were to be. Unfortunately the colonists brought with them all the prejudices of their former European environment. Even those who had been driven from Europe by religious persecutions refused to permit religious liberty in America. Only the Quakers in Philadelphia allowed freedom of worship. As a result, Philadelphia, though latest founded and situated far from the sea, soon became the largest city of the colonies and the centre of their cultural and commercial life. Massachusetts grew very rapidly, receiving some 20,000 immigrants before the middle of the century, and Harvard College, the first collegiate institution in English America until the 18th century, was founded in 1638. The first book printed in the English colonies was the Massachusetts Bay Psalm Book (1639).

The great social worker of the century, the type of social reformer that was to come, is Vincent de Paul (b. 1576; d. 1660), perhaps the greatest benefactor of the poor that ever lived. Ordained priest at 25, he was captured by Turkish pirates shortly afterward and sold in Tunis as a slave. After two years, he escaped with his master, a renegade Christian, whom he brought back to his religion. After this experience, the one ambition of his life was to do good to those in need. The poor in the country places in France were sadly neglected — little better than slaves on the land. He organized missions and conferences of charity for their benefit. By his enthusiastic and yet thoroughly practical ways, he won to his aid a number of distinguished patrons. Then he took up the care of the convicts in the galleys. While on land, they were crowded, in chains, in damp dungeons, their only food black bread and water, and they were covered with vermin and ulcers. He went among them, bringing them food, medicines and, above all, human solace. Nothing was repulsive to him and he dressed the ugliest of wounds. He began his work in Paris and when it attracted the attention of the king, Louis XIII, and he was appointed Royal Almoner, he took advantage of the position to visit Marseilles and Bordeaux. In each place a hospital was erected for the convicts. Their moral regeneration was even more his care than their physical improvement. He recognized the

need of special training for the assistants in such social work for the missions and charities, and so he established an association for this purpose. He gathered around him as an auxiliary a number of ladies of the nobility of France, organized as the Ladies of Charity. Through them he collected immense sums of money which were distributed to the poor. Foundling children were his special care, particularly after he discovered that sometimes they were deliberately deformed by scoundrels who thus appealed to public pity. The municipal asylum for foundlings was little better than a place for them to die. The 17th century was a time of war, with poverty rife, and the children suffering above all, so Vincent next organized the Daughters of Charity, young women who were willing to devote their lives to social service. This foundation still exists as the well-known Sisters of Charity, all over the world. Poverty became so bitter that Vincent had to organize for the shelter and employment of some 40,000 unemployed near and around Paris. His reputation and prestige enabled him to get the needed help. The king granted the lands of the Salpetrière for a hospital and lodgings. In what is known as the French Period of the Thirty Years' War, the war zone, as in our own time, was in Lorraine, Franche-Comté and Champagne, around Metz, Toul and Verdun, for nearly 25 years. Vincent came to the assistance of the poor people there, secured hundreds of thousands of dollars at a time when money was worth five or six times as much as now. He established a periodical, *Le Magasin Charitable,* in order to publish accounts of what was done, to call attention to special needs, and touch the hearts of others by letters received from those helped. He founded a series of public kitchens to feed the poor, and also to instruct them how to prepare their food economically and advantageously. He himself gave minute instructions as to the quantity of fat, butter, vegetables and bread people should use and the mode of preparing the soup. He founded societies to bury the dead and clear away dirt to prevent disease. These were under the Sisters of Charity. He distributed seeds so that the war-stricken people might prepare their harvest. The triumph of his charity is the foundation of a special organization for the relief of the impoverished nobility. In the midst of all this work, he lived to be 85 years of age and wrote some 30,000 important letters, all of them without exception for some good purpose for others.

JAMES J. WALSH,
Author of 'The Thirteenth, Greatest of Centuries.

PRINCIPAL EVENTS OF THE SEVENTEENTH CENTURY.

1603. Queen Elizabeth of England dies. Union of Scotland and England under James I.
1605. The English gunpowder plot.
1607. Hudson's Bay discovered by Hendrik Hudson.
1608. Galileo with a telescope observes the satellites of Jupiter.
1610. Assassination of Henry IV, king of France.
1614. Logarithms invented by Napier.
1618. Manchus invade China.
1619. Harvey discovers the circulation of the blood.
1620. Voyage of the *Mayflower.* The Pilgrims land at Plymouth Rock. Slavery introduced in Virginia.
1625. Charles I of England begins to reign.
1627. Siege of Rochelle. Torricelli invents the barometer. Drabellius invents the thermometer.
1629. Cardinal Richelieu becomes Prime Minister of France.
1631. Battle of Leipzig.
1632. Death of Gustavus Adolphus at the battle of Lutzen.
1641. The Irish rebellion and massacre of Protestants.
1642. Civil war begins in England. Battle of Edgehill.
1643. Louis XIV of France begins to reign. Wars of the Fronde.
1644. Cromwell's victory at Marston Moor over the English royalist forces. The Chinese Ming dynasty overthrown and the Manchu rule established.
1645. Complete defeat at Naseby of King Charles of England.
1648. End of Thirty Years' War.
1649. Charles I of England beheaded.
1653. Cromwell becomes lord protector of England.
1660. The English restoration. Charles II becomes king of Great Britain. Death of the great social reformer of the century, Vincent de Paul.
1665. The great plague of London in which 68,000 persons died.
1666. The great fire of London which in three days destroyed 13,000 houses.
1667. French invade the Netherlands.
1668. The peace of Aix-la-Chapelle.
1678. The habeas corpus act passed in England.
1683. The Turks capture Vienna.
1685. James II becomes king of Great Britain. The Newtonean philosophy first published. Revocation of the edict of Nantes.
1688. War of the Spanish succession. Revolution in Great Britain. James II abdicates
1689. Peter the Great becomes tsar of Russia. William and Mary crowned rulers of Great Britain.
1690. The Battle of the Boyne.
1692. The Massacre of Glencoe.
1697. Charles XII becomes king of Sweden. The peace of Ryswick.
1700. The grandson of Louis XIV of France succeeds to the Spanish throne.

SEVENTH CENTURY. The outstanding events of this century centre around the rise of Mohammedanism or Islam (submission to God). From a small town in Arabia it spread over Asia to the Indus, through northern Africa, then to Spain and across the Pyrenees into southern France within a century. Mohammed, born at Mecca in Arabia, was a camel driver. He was a young man who was brought in contact with many different peoples, and earlier had been a watcher of flocks by night when men are tempted to think deeply about the relations of man to the universe. The Arabs and the Hebrews are the two most important branches of the Semitic race, to whom the world owes so much of thought with regard to religion. Mohammed passed through a series of mental struggles, and though unable to read and write declared that the angel Gabriel came to him in sleep and made a series of revelations so that he thought of himself as a messenger of God. These revelations became the Koran. He lived in retirement, teaching, but making few disciples especially in Mecca, though his doctrines were carried to Medina where they attracted a number of converts. The Meccans, fearing that his new teaching would disturb popular feeling toward their Holy City where was the Kaaba (the cube stone around which centred the idolatrous worship of the Arabs), rose against him and he fled to Medina. This flight (622) *hegira* (Arabic) was adopted as the beginning of a new era from which Mohammedan history still reckons. At Mecca, Mohammed had only preached, but at Medina he became a ruler and lawgiver. After a time he led his troops to the capture of Mecca, and Islam as a conquering religious empire began its history. Ten years after the *hegira* Mohammed died, but his teaching and the kingdom which he had founded lived on. At first his doctrines were scarcely more than Judaism with a slight admixture of Christianity adapted for the Arabs. His first disciples were instructed to turn toward Jerusalem to pray, but later Mecca was substituted, and Judaism and Mohammedanism definitely parted.

The spread of Mohammedanism is a mystery until it is realized that it represents the religious motives which animated a series of barbarous tribes in their national efflorescence. The Arabians discovered their power just when the Roman Empire was reaching a depth of decadence that made it a ready victim. Mohammed taught that man's life was fated, predestined to good or evil from all eternity, but that death for the cause of Mohammedanism was an assurance of heaven. Fanatic fatalism made indomitable warriors of the Arabs and a series of commanders arose who led armies in all directions that soon gave wide extension to Mohammedanism. The interior of Arabia was conquered, and the whole Arab nation united in six years, Syria was overcome and all the Byzantine Greeks, Damascus was taken and the victory of Yermuk in Palestine completed the conquest (636). Jerusalem opened its gates to the Caliph Omar, and finally Antioch, the great capital of Syria, surrendered (638). The army directed toward Mesopotamia was equally successful. Persia was defeated in a great battle at Kadesia which lasted three days and in which 150,000 Persian soldiers were overcome by 30,000 Arabs. Ctesiphon fell into their hands, Ispahan was captured and Persepolis sacked, and by the middle of the 7th century Khorasaan became subject to the Arabs. Egypt suffered the same fate. Alexandria was seized about 646, and clever advantage was taken of the disaffection on the part of the Copts, or natives, toward their Greek rulers whom they considered foreigners and heretics. Amru or Amer, the Arab general in command in Egypt, proved himself a statesman as well as a leader of armies, and as he gave the country a much better rule than it had had under the Eastern Empire, he won the people. The story that either he or the Caliph Omar ordered that the great library at Alexandria should be burned is probably without foundation. Amru proposed to connect the Nile and the Red Sea by canal but the project was abandoned for fear of opening to the unbelievers a way to the sacred cities of Arabia.

In spite of divisions among the rulers, the spread of Mohammedanism continued under the Ommiads, the first of whom, who became ruler in 661, was Moawiyah, the descendant of Omayya, founder of a well-known Arab family. The Ommiads succeeded Ali, Mohammed's son-in-law, the husband of his daughter Fatima, and occupied the throne for some 90 years until 750 A.D. The last of these Ommiads escaped to Spain and founded the Caliphate of Cordova, where the family ruled for nearly 300 years. Under the Ommiads, Damascus became the capital of the Mussulman Empire. By 672 their power had become so firmly fixed that they attacked even Constantinople itself by land and sea, and the capital of the Greek Empire was only saved by the use of Greek fire, an invention of a Syrian, which caused havoc among the wooden vessels of the Mohammedans because water would not quench it but actually caused it to burn more fiercely. Having spread over northern Africa, the Mohammedans were ready at the beginning of the 8th century to cross over into Spain and to begin the series of attacks on civilization from the West which so often put it to the hazard. The followers of the religion of the camel driver of Mecca threatened at one time to overrun and rule the world. Their war cry, «God is God and Mohammed is His Prophet,» came to be the terror of Christians everywhere. Mohammedan pirates made the Mediterranean itself, and even many of the larger coast cities, places of terror because of their rage. The contradictions in the Koran, the emphasis on the sensual rewards that the faithful were to enjoy in the hereafter, the denial of the moral freedom of man, all these did not prevent the spread of the doctrine.

The Mohammedans were in close touch with the Grecian culture in the Eastern countries, and as ever in history «captive Greece led its captor captive.» The Saracens, children of the desert as they called themselves, were in the course of two generations of close contact with the Greek cities of Asia Minor, deeply influenced and reached a stage of high intellectual development. They often were more highly civilized in the intellectual sense of the term than the Germanic conquerors of the Roman Empire with whom they came in contact in the West. For some centuries the Arabs carried on the Greek tradition and represented the highest culture in the world. They accomplished little that was progressive, though the 'Arabian Nights' and some of their poetry are eminently original contributions to world literature. The Arabs by a curious contradiction consonant, however, with their Semitic character, possessed the two opposite qualities, the mystic and the practical. They accomplished much more in science than in literature. The number of words of Arabic origin used in the sciences demonstrate this. Alchemy, alcohol, alembic, algebra, almanac are but a few examples in «a.» They had the advantage of close touch with the work of the Greeks in science, and this enabled them to out-distance the Western Europeans. Their great cities — Bagdad, Cairo and Cordova — were centres of learning as well as of world commerce. They developed an attractive style of architecture and were the intellectual leaders of mankind in the mid-mediæval period. They added much less to what they had learned from the Greeks than has been thought, and their reputation for great advances in medicine and surgery has been rudely disturbed by modern studies in medical history. Their religious prejudices hampered the development of anatomy and of surgery, and their oriental tendencies led to unfortunate polypharmacy. Arabian physicians developed what, from the number of ingredients, came to be known as *calendar* prescriptions. Modern medicine had its real beginning when Arabic influence declined and when Græcisms and not Arabisms are to be found in the medical writers.

The intellectual light of the century in the West is Isidore (560–636), who became archbishop of Seville 599. His influence was far-reaching. He presided over the Fourth Council of Toledo (633) and to him are attributed most of its decrees. All bishops were required to establish seminaries, the study of Greek and Hebrew as well as the liberal arts was prescribed, and interest in law and medicine encouraged. The Arabs are usually set down as

introducing Aristotle into Spain, but Isidore had done that long before. He wrote the first *summa* of knowledge, and his work was used as a textbook during most of the Middle Ages, and was printed no less than 10 times between 1470 and 1529, some thousand years after his time. It contains information almost in the same form as the modern encyclopedia. There is much more insistence on religious questions than in our time. Isidore quotes 154 authors, Christian and pagan. His information is well ordered, so that no wonder it attracted attention. Many editions of portions of the work were issued in the 19th century. Mommsen edited the historical writings of Saint Isidore among the 'German Monuments of History' (Berlin 1894). The eighth Council of Toledo showed its critical appreciation by declaring him "the extraordinary doctor, the latest ornament of the Church, the most learned man of the latter ages, always to be named with reverence." Isidore's works are the touchstone by which the human interests of this century may be judged.

A great educator of the time was Columbanus, the Irish abbot of Bobbio in Italy, who died there in 615. At the end of the 6th century he had come over to France (probably 585) with 12 companions, three of whom, Saint Attala, Saint Gall and Columbanus the Younger are well known in history. He established the celebrated abbey of Luxeuil, after having founded the abbey of Annegray in the Vosges, but even two monasteries did not suffice for the numbers who came to join him and a third had to be established at Fountains. He deprecated the conduct of Queen Brunehilde, who strove to counteract his influence by introducing religious elements into their differences. The question of the Celtic observance of Easter and of the Celtic, that is the anterior instead of the poll tonsure was brought up. To avoid contention that might give scandal, Columbanus thought it better to leave France for Italy. On his way he left Saint Gall to found the monastery called after him in Switzerland, while he himself, having been given by the king of the Lombardi a tract of land known as Bobbio between Milan and Genoa, erected early in the 7th century the celebrated abbey which for centuries was a stronghold of orthodoxy in northern Italy.

The beginning of the century saw the climax and sad end of the career of a great woman, Brunehilde or Brunehaut (the brunette), daughter of Athanagild, king of the Visigoths, who married Sigebert, king of Austrasia (561). She was intensely ambitious, both for her husband and herself, and of indomitable energy. She did great good by introducing the principles of Roman law which had ruled at the court of her father among the Austrasians. Unfortunately her ambition incited a series of wars between her husband and his brother, in the midst of which her husband was treacherously killed. She became regent for her minor son, but her reign was the beginning of the downfall of the Merovingian dynasty, for mayors of the palace are now mentioned for the first time as exercising power, and the growth of their influence in succeeding reigns finally brought about an end of the ruling house toward the end of the century. Brunehilde was learned as well as ambitious, and deeply intent on securing for her people all the benefits of civilization. She ruled over two-thirds of Gaul better perhaps than it had ever been governed before. She had roads constructed to facilitate intercourse and commerce, was a patroness of education and the arts, and destroyed whatever remained of idolatry among the people. She built a number of monasteries, partly for educational reasons and partly for the facilities they provided for the solution of social problems in country places. To her is attributed the foundation of one of the very early French hospitals at Hautonne. Dagobert, in the first half of the 7th century, is said to have founded a hospital in Paris. Haeser places the foundation of the Hotel Dieu shortly after the middle of this century. Brunehilde's ambition, however finally overreached itself and brought her to an ignominious fall. Pope Gregory I, the Great, had written to congratulate her on all that she was doing for Christian civilization, but when she endeavored to maintain her position as ruler by encouraging her grandson in licentiousness so that she might have more power over him, Saint Columbanus reproached her with it, and though he was driven from his monastery of Luxeuil on pretense of heretical tendencies, the clergy became exasperated, and finally the whole kingdom became disaffected, and offered to recognize Lothair II, if he would relieve them of Brunehilde's rule. He marched against her and she was abandoned by her army on the banks of the Aisne where with her four grandsons she fell into the hands of Lothair, who had the four princes put to death and bound Brunehilde at the age of 80 to the tail of a wild horse who dashed her to pieces as he ran away (613).

The climax of Merovingian power was reached in the reign of Dagobert I (602–638), who secured the Franks a preponderance in western Europe. Dagobert put down the Wens, organized the Saxons to resist the encroachment of the Slavs on Thuringia and delivered Bavaria from the Bulgarians who were ravaging that country. Finally he became the master of practically all Gaul, and strengthened his position as ruler by restraining the nobles, preventing abuses and violence, and going through the country to give audience to great and small. He improved the laws, favored commerce at home and abroad, formed an alliance with the Lombards of Italy and the Visigoths of Spain and sent ambassadors to Heraclius the Eastern Emperor. He encouraged art and the arts and crafts, and some of the jewelry of the Merovingian times recently excavated show us how high was the taste of the period.

The great master in the industrial arts was the famous Saint Elois or Eligius (588–659) who was a goldsmith but afterward became the bishop of Noyon. He was a favorite of Dagobert, who went to him for counsel in the foundation of churches and monasteries and in the distribution of alms to the poor. Around Saint Eligius' name a 19th century controversy developed because Moshcim, the German church historian (18th century), had quoted from one of his sermons expressions which seemed to indicate that the essence of Christianity at that time consisted in the paying of church fees. As a matter of fact, the sermon from which the quotation was taken shows that Saint Eligius insisted on all the highest virtues of Christianity. He is himself a fine type of the sincere churchman, devoting himself and all his faculties to the benefit of Christianity.

The great struggle in France between the kings and the higher nobility, which was to continue for so many centuries to hamper national progress, may be traced in its beginnings to this time. The question of the limitation of land grants to the length of the life of the grantee so that each king on his accession might revoke such grants except on assurance of the continued loyalty of the possessors of the land, was one of the factors which made for the establishment of feudalism somewhat later in history, though its earliest manifestations can be noted at this time. The weakness of the Merovingian monarchs only complicated the problem and gave the nobles opportunity to entrench themselves in their possessions.

The great ruler of this century is Heraclius, the Eastern Emperor (575–641). He was the son of Heraclius, governor of Africa, and succeeded to the imperial throne through a conspiracy between his father and Crispus, the son-in-law of the Emperor Phocas. He proved for many years just the ruler that was needed for the Eastern empire. Under Justinian the armies of that emperor had succeeded in reconquering Italy and Africa, and re-establishing the empire in something of its old-time prestige. Barbarous nations had been encroaching more and more on the frontiers of the empire, and the Avars from the North and the Persians made serious inroads. Heraclius set up the Croats and Serbs in Illyricum as a barrier against the Avars, but he himself led his armies against the Persians, and after many strenuous campaigns in the third decade of the century he annihilated Persian power and re-established the Imperial dominion. This hard task had only just been completed, however, when the Mohammedans began their inroads, and Heraclius had to see his recent Eastern conquests fall under the dominion of this new power in the East, which was to prove so serious an enemy to the Eastern empire and finally bring about its fall.

All during this century the existence of the Exarchate of Ravenna (instituted 568, ended by the Lombards 752) acted as a conservative element in Western civilization. The beautiful architecture and interior decoration of the churches and palaces in Ravenna preserved a taste for the beautiful and an appreciation of art. Its presence kept alive the imperial idea and principle in the minds of Westerners who would probably have lost sight of it if they had only Constantinople in the East to think of. It conserved the idea of a Roman empire and so prepared the way for Charlemagne's dominion and for the feeling of solidarity to some extent among the Western nations. The presence of the Exarch at Vienna accomplished much for peace in Italy and gave some opportunity at least for the cultivation of the arts of civilization instead of utter devotion to the art of war. Under a great ruler like Heraclius the influence of the Greek or Byzantine empire in the West was deeply felt. The maintenance of a strong Greek imperial outpost at Ravenna warded off to a great extent the Slavic races of eastern Europe from invading the South until Christianity had come to modify in some respects their barbarism.

Two immortal names are associated with the abbey of Whitby as it has come to be known, though its original name was Streonshalh (Saxon), founded in this century. (The existing remains date from the 12th century). Hilda or Hild, the abbess, and Cædmon, the poet, were here in the second half of the century. Hilda (614–680) is noteworthy as the foundress and, after the Celtic tradition, the head of a monastery in which there were both men and women. She was of royal descent and had been abbess of Hartlepool (649). Cædmon was a stableman at Whitby, who, ashamed of the fact that he could not respond to the request for a song which was customary at the abbey dinners on high festival days — the custom of thus entertaining themselves at this time is noteworthy — retired to the stable and there was commanded in a dream "to sing the beginning of created things" (Bede). In the morning he remembered his dream and his poetical gift was fostered by Hilda until he produced his great poem of 'Creation,' a metrical paraphrase of the Old Testament, the first monument of English literature. It is said to have influenced Milton deeply. Another great abbey, that of Glastonbury, was refounded in this century. It became a centre of the intellectual and spiritual life of the time. Around it gathered the legends of the visit of Joseph of Arimathea to England, whose staff planted became the famous Glastonbury thorn which blooms every Christmas eve, as well as of the legends connected with King Arthur who is supposed to be buried here on the Isle of Avalon (Isle of Souls or Land of the Blessed). Glastonbury and Whitby continued to be important religious and educational institutions until the time of Henry VIII. There are very old traditions which would place the foundations of Cambridge and Oxford in this century, especially the former, and while false in formal fact, there is an element of truth in them because of the great interest which this century evinced in educational foundations of various kinds and which seems to have touched also the immediate neighborhoods where are now the great English universities.

JAMES J. WALSH,
Author of 'The Thirteenth Greatest of Centuries.'

PRINCIPAL EVENTS OF THE SEVENTH CENTURY.

602. Dagobert began his reign in western Europe.
610. Mohammed began to preach at Mecca.
613. Brunehilde, queen of Austrasia, was brutally put to death by Lothair II.
614. Persians captured Damascus and Jerusalem.
626. Persians besieged Constantinople.
627. Li-Chimin, son of the founder of the Tang dynasty, ascended the throne of China and assumed the name of T'ait-ning.
631. Nestorian Christian missionaries visited China.
632. Death of Mohammed.
634. The Arabs occupied Damascus.
636. The victory of Yermuk completed the Arab conquest of Syria.
637. Jerusalem surrendered to the Arabs.
638. Persian power was overthrown at the battle of Kadesia.
639. The Arabs invaded Egypt.
641. Death of Heraclius, the Eastern Emperor.
643. Theodosius, emperor of Constantinople, and the king of Persia, sent envoys to the emperor of China with gifts of rubies and emeralds. Chinese civilization reached its climax.
646. Arabs captured and occupied Alexandria.
672. Arabs began a seven years' siege of Constantinople. Their first attacks were foiled by Greek fire which destroyed their ships.
680. Cædmon, the Anglo-Saxon poet-author of the 'Creation,' died.
692. Arabs destroyed Carthage.

SEVENTH DAY BAPTISTS. See BAPTISTS, SEVENTH DAY.

SEVERINUS, sĕv-ĕr-ē'nŭs, **Saint,** the Apostle of Norica: b. either in northern Africa or southern Italy; d. Jan. 482. After the death of Attila in the 5th century he journeyed through the territory along the Danube, preaching Christianity, and through his courage and good work gained great influence over the people and made many converts. After his death his body was taken into Italy by Lucillus, one of his followers, and found its final resting place on a small island near Naples.

SEVERN, sĕv'ĕrn, **Joseph,** English artist: b. Hoxton, 7 Dec. 1793; d. Rome, Italy, 3 Aug. 1879. He was self-taught and won, after great struggles, the Royal Academy historical painting prize in 1818. Early in life he formed a friendship for the poet Keats, for which he is chiefly noted; in 1820 accompanying the poet to Italy, and caring for him there until Keats' death the following year. He painted several portraits of Keats. In 1821 Severn exhibited 'The Death of Alcibiades' at the Royal Academy and won a traveling pension. He subsequently served as British and as Italian consul at Rome, where he lived until his death, devoting his time chiefly to the painting of miniatures. He wrote some, but his literary work is of no importance. He was buried near his poet-friend. His best-known pictures are the 'Roman Beggar'; 'Specter Ship,' and his work on the altar of Saint Paul's Church, Rome. Consult Sharp, 'Life, Friendships and Letters of Joseph Severn' (1892).

SEVERN, England, the second river in size and most important in the country, rises at Maes Hafren in Montgomery County, and after a winding course of about 200 miles falls into the Bristol Channel. The Vyrnwy enters the Severn on the Shropshire borders, the Wye, below Chepstow and the Lower Avon about eight miles below Bristol. At Welshpool the Severn begins to be navigable, about 178 miles above its mouth. Near Gloucester it branches forming the Isle of Alney. It is a great tidal river, with a remarkable eager or bore; vessels of 400 tons can ascend as far as Worcester. Below Gloucester navigation is impeded, and its low banks at this point cause frequent inundations. A railway tunnel (four and one-half miles) passes under the estuary near the Wye.

SEVERO, sā-vā'rō, or **NORTHEAST CAPE.** See CHELYUSKIN, CAPE.

SEVERUS, sẹ-vē'rŭs, **Alexander.** See ALEXANDER SEVERUS.

SEVERUS, Lucius Septimius, Roman emperor: b. near Leptis, Magna, Africa, 146 A.D.; d. York, Britain, 211 A.D. After the murder of Pertinax, in March 193 he was proclaimed emperor by his troops at Carnuntum. Thereupon he marched to Rome to crush the partisans of Didius Julianus, who had meanwhile purchased the imperial purple from the Prætorians. On his approach Julian was deserted and assassinated by his own soldiers. In professing that he had assumed the purple only to revenge the death of the virtuous Pertinax, Severus gained many adherents and was enabled to banish the Prætorians. But while he was victorious at Rome, Pescennius Niger was in the East at the head of a powerful army, by which he also had been called to the purple. Getting rid of the rivalry of Albinus by conferring upon him the title of Cæsar, Severus at once directed his arms against this eastern competitor. On the plains of Issus, Niger was totally ruined by the loss of 20,000 men (194). After devastating some territory beyond the Euphrates, Severus took Byzantium, which had shut her gates against him, but only after a protracted siege (196); and he then returned to Rome, resolved to destroy Albinus. He attempted to assassinate him by his emissaries, but when this failed, Severus had recourse to arms, and defeated Albinus near Lyons (197). After returning to Rome Severus marched into the East to repel an invasion of the Parthians; made himself master of Seleucia, Babylon and Ctesiphon, and advanced far into the Parthian territories. From Parthia he marched toward the more southern provinces of Asia and entered Alexandria. A rebellion in northern Britain called him away again in 208. After penetrating to the far north of Caledonia, and losing a vast number of men, he returned southward and rebuilt or repaired the wall of Hadrian across the island from the Tyne to the Solway Firth. The jurist, Paprianus, flourished during his reign and introduced improvements in the administration of justice. Consult Platnauer, M., 'The Life and Reign of the Emperor Lucius Septimius Severus' (Oxford 1918).

SEVERUS, Wall of. See HADRIAN'S WALL.

SEVIER, sĕ-vēr', **John,** American pioneer: b. Rockingham County, Va., 23 Sept. 1745; d. near Fort Decatur, Ga., 24 Sept. 1815. Having founded the town of Newmarket, Shenandoah County, Va., and there become a celebrated Indian fighter, he served as captain in the Virginia line during Lord Dunmore's War (1774; see COLONIAL WARS IN AMERICA). He had removed in 1772 to the Watauga colony on the western slope of the Alleghanies and been, next to John Robertson (q.v.), the most prominent of the settlers. Now, at the beginning of the Revolution, he drafted a memorial to the legislature of North Carolina, requesting annexation to that colony, and as a result all of the present Tennessee was made a county of North Carolina and known as Washington district. He served in the North Carolina legislature and was appointed district judge at Watauga. Elected colonel of the trans-Alleghany forces, he commanded in many Indian fights, distinguishing himself at Boyd's Creek (1779) and King's Mountain (1780). After the war, North Carolina found that the retention of the large section now known as Tennessee would entail obligations for a corresponding portion of the Federal debt and, therefore, the tract was made over to the central government. The settlers then determined to organize an independent State and regularly apply for admission to the Union. At a convention held 23 Aug. 1784 Sevier was elected governor of the new State of Franklin, as it was called. North Carolina now recognized its mistake and granted Watauga a Superior Court, besides organizing the militia troops into a brigade with Sevier as brigadier. But Sevier entered office as governor 1 March 1785, reorganized the military, established a Superior Court and concluded treaties with the Cherokees. In 1787 Governor Caswall of North Carolina declared the Franklin government a revolt, subdued it by force of arms, imprisoned Sevier and ceded the region to the Federal government. Sevier was afterward made brigadier-general of forces in the territory south of the Ohio, in 1790 elected as first representative of Congress from the Mississippi Valley, and in 1796 was elected governor of the new State of Tennessee, serving three successive terms. In 1803 he was re-elected and again served three terms consecutively. He was chosen to Congress in 1811 and returned for a third term. Consult Gilmore, 'Rear-Guard of the Revolution,' and 'Life' (1887).

SEVIER, a salt lake in Millard County, in Utah, just west of the Beaver River Range, in lat. 30° N., long. 130° 10′ W., and at an altitude of 4,000 feet. Sevier River enters it on the north and it has no apparent outlet. The water lines of the valley surrounding the lake show that at one time it was of considerable extent and was a part of Lake Bonneville (q.v.), together with Great Salt Lake, Lake Lakeshore and other bodies of salt water in the vicinity. In 1872 Sevier Lake was 28 miles long, 10 miles wide and had a surface area of 188 square miles. For over 30 years the waters of Sevier River have been used for irrigation, and so great is the quantity now used for this purpose that during the summer months the bed of the lake is almost dry and the salts have been precipitated so as to form a crust over the lake bottom. This crust is composed of about three-fourths sodium chloride and the other fourth is nearly all magnesium sulphate and sodium sulphate. The crust is estimated to be about 1,500,000,000 tons. The only animal life found in the lake are *Artemia,* a species of brown shrimp and the larvæ of some insects. Fishes entering the lake from the river are poisoned by the strong brine.

SÉVIGNÉ, Marie de Rabutin-Chantal, mā-rē dẹ rā-bü-tăn shăn-tăl sā-vēn-yā, MARQUISE DE, French writer: b. Paris, France, 5 Feb. 1626; d. Grignan, Drôme, France, 17 April 1696. She was the daughter of Baron de Chantal, was left an orphan in 1633, and brought up by her maternal grandparents, and by her uncle, the Abbé of Livry. She was married in 1644 to the Marquis Henri de Sévigné, who was killed in a duel in 1651, leaving her the mother of a son and a daughter. Though gifted with wealth, beauty, talent and high social position, she made no second marriage, but devoted herself to the education of her children, and to reading, meanwhile moving as one of the most brilliant members of the literary circle of the Hôtel Rambouillet. She was devotedly attached to her daughter, who was married in 1669 to the Comte de Grignan, and shortly afterward accompanied him to Provençe, where he had been appointed lieutenant-governor. This separation resulted in the voluminous correspondence, which, while not intended for publication, has since been given to the world, and has made the writer famous, the letters being models of literary style and of great historical value. They cover a period of only about seven years, as after 1687 Madame de Sévigné was rarely separated from her daughter, who died in 1694. The correspondence abounds in delightful gossip, witty anecdote, clever remarks on men and topics of the day, and graceful delineation of the pleasures and gaieties of Parisian society. They mirror the life of the woman who was in turn the noted beauty of the court, the brilliant wit of the Hôtel Rambouillet, the religious devotee, the woman of business, endeavoring to make her income meet the demands placed upon it by her extravagant son, the appreciative student of Virgil, Montaigne, Molière, Pascal, Arnauld, Quintilian, Tacitus and Corneille, and always the devoted mother, deploring the enforced separation from her daughter. They fill 14 large volumes, and were first published in 1726. Successive editions have appeared at intervals, the best being that of Monmerqué in the 'Grands Ecrivains' series (14 vols., 1862–66), completed by the 'Lettres Inédites of Capmas' (2 vols., 1872). Consult Walckenaer, 'Mémoires touchant la Vie et les Ecrits de Madame de Sévigné' (1842); Combes, 'Madame de Sévigné historienne' (1885); Saporta, 'La famille de Madame de Sévigné en province' (1889).

SEVILLE, sĕv'ĭl or sẹ-vĭl', or **SEVILLA,** sā-vēl'yā, Spain, (1) capital of the province of the same name, on the east bank of the Guadalquivir, 62 miles northeast of Cadiz. The principal buildings are grouped around or near the Plaza del Triunfo. The great Gothic cathedral, which ranks next to Saint Peter's at Rome, was built (1401–1519) on the site of a Moorish mosque, and comprises a profusion of works of art and historical treasure, paintings by Murillo, De Vargas, etc., gilt and colored wood carvings by Dancart (1482), fine sculptures and superb metal work, costly and curious statues and reliquaries, a large organ, and above all the delicate Moorish stone and marble tracery which decorates the interior. In the nave are the tombs of Fredinand III and of Ferdinand, the son of Columbus. The approach is made by a high flight of steps, and the cathedral is surrounded by the shafts of 100 antique columns. The east and north portals contain respectively some fine sculpture and bronze doorways. The immense clustered pillars, the magnificent stained glass by Flemish artists, and the Giralda (q.v.) or Bell Tower (the finest in Europe) are interesting features. North of the cathedral is the Patro de los Naranjos, with the library of Columbus — containing some valuable works and manuscripts — and the original Moorish fountain. The Alcázar is the chief specimen of Moorish arthitecture in Seville, and only second to the Alhambra in beauty and interest. It was founded in 1181, was the Arabian royal palace and was surrounded by walls and towers. Its most conspicuous features are the façade, the hall of ambassadors, and the patro de las muñecas. In the rear are beautiful gardens. The Exchange contains many historical documents. The Ayuntamiento or city hall is a fine specimen of the Renaissance, between the Plaza de la Constitucion and the Palaz de San Fernando. Adjoining is the Audiencia or Court of Justice. The other noteworthy buildings are the Casa de Pilatos (15th century), with a fine colonnade and courtyard and the Casa de las Dueñas, with numerous courtyards and nine fountains. The remarkable churches include Omnium Sanctorum, San Marcos, Santa Maria

la Blanca (an ancient synagogue), and La Caribad (the latter containing several *chef d'œuvres* by Murillo and J. de Valdes Leal. Many of the churches, in themselves uninteresting, contain masterpieces of sculpture and painting. The Museum contains works of art of inestimable value, representing the School of Seville (16th and 17th centuries). Other notable buildings include the University (1254) (1567), formerly a convent; the archbishop's palace; the royal cigar factory, "Fabrica de Tabacos," an enormous and palatial building, with many courts, fountains, and tropical plants; the palace of San Telmo and the picture gallery. The chief squares not mentioned are the Plaza Nueva, the Plaza del Duque, the large bull-ring, which ranks next to that at Madrid, and the Quemadero, the former scene of the *Autos-da-fé*. Las Delicias is a charming promenade along the river bank. The suburb of Triana is inhabited by gypsies and the poorer class. The Guadalquivir is a tidal river and navigable for large vessels into the city itself. Seville has always been an important commercial port. The exports include lead, quicksilver, iron ore, olives, oranges, cork and copper pyrites; the imports timber, drugs, chemicals, coal, coke, machinery, petroleum and coffee. The principal manufactures are tobacco, porcelain, hardware, soap, leather goods, chocolate, corks, etc. The Pickman tile factory at Cartuja is an old and noted porcelain manufactory. A railway connects the city with Cadiz and Cordova, and an iron bridge and two other bridges (one belonging to the railway) connect it with Triana (where typical peasant games and costumes are seen). Seville was first colonized by the Phœnicians, from whom it passed in turn to Romans, Vandals, Visigoths and Arabs and was finally taken by Ferdinand of Castile (1248), 300,000 Moors voluntarily seeking exile. It suffered many revolutions prior to this period, and later was depopulated by a yellow fever scourge. Under Soult (1810) the French robbed the city of her riches. The discovery of America gave the town considerable commercial importance as the seat of American trade. It is the birthplace of Velasquez Murillo and other celebrities. Pop. about 158,300. Consult Calvert, A. F., 'Seville' (London 1907); Gallichan, W. M., 'The Story of Seville' (London 1903).

(2) The province has an area of 5,428 square miles, and forms a part of Andalusia. The summits of the Sierra Morina rise at the north to a high elevation; south, the surface is low and fertile. The Guadalquivir is the principal river, and its affluents are the Genil, the Guadira, and the Guadalimar. The province is exceedingly fertile and produces all cereals and vegetables. The exports include tobacco, leather, paper, chocolate, silk and woolen goods, glass, soap and pottery. The chief European domestic animals are abundant, and in the higher districts occur copper, silver, lead, iron, coal, and salt mines, besides chalk and marble. Trade has developed rapidly by the building of railways in recent times. Four senators and twelve deputies represent the province in the Cortes. The chief towns are Seville (q.v.), Carmona, Constantina, Ecija, Lebrija, Marchena, Morón de la Frontera, Osuna and Utrera. Pop. about 613,000.

SÉVRES, sāvr, France, in the department of Seine-et-Oise, on the Seine, lies about 10 miles southwest of Paris, and an equal distance from Versailles. Its celebrated porcelain manufactory, founded at Vincennes in 1745 and removed to Sèvres in 1756, was purchased by Louis XV, 1760. In 1876 the old and dilapidated buildings were replaced by a new structure, erected in the park of Saint Cloud. The Porcelain Museum contains numerous articles of china collected from all over the world, which represent every age and clime. A technical School of Mosaics was established here in 1875. Besides the celebrated Sèvres vases, painted glass and mosaics are made. In the artistic pottery the *pâte-sur-pâte* (or layers) method is used — original to this manufactory. The general effect is that of a cameo, though possessing greater delicacy and rich coloring. (See Ceramics; Porcelain). Sèvres has other manufactures of shawls, cordage, leather and chemicals. It was occupied by the German troops in 1870, bombarded by the French a few weeks later, and attacked by the troops of the Commune in 1871. Pop. about 8,500.

SÉVRES PORCELAIN. See Porcelain.

SEWAGE. See Sanitary Engineering: Wastes, City, Disposal of; Garbage.

SEWALL, sū'al, **Frank,** American Swedenborgian clergyman: b. Bath, Me., 24 Sept. 1837; d. 7 Dec. 1915. He was graduated from Bowdoin in 1858, studied at the universities of Tübingen and Berlin, and afterward engaged in pastoral work in Ohio. He was president of Urbana University, Ohio, for 16 years, was engaged as a pastor in Glasgow, Scotland, for some time, and after 1890 was engaged at Washington, D. C. He wrote many books of a denominational and religious character, and translated with much success from French and Italian poetry. His works include 'The Christian Hymnal' (1867); 'Moody Mike' (1869); 'The New Metaphysics' (1888); translations, 'Poems of Giosue Carducci' (1892); and 'Sonnets of J. M. de Heredia' (1900); 'Swedenborg and Modern Idealism' (1902); 'Reason in Belief' (1906), etc.

SEWALL, Jonathan Mitchell, American poet: b. Salem, Mass., 1748; d. Portsmouth, N. H., 29 March 1808. He studied at Harvard, was for a time in trade, but took up the law, practised in Grafton County, N. H., and became register of probate there in 1774. His songs and verses appeared widely in American newspapers in the Revolutionary time, 'War and Washington' being among those familiar to the army. Probably a good share of his poetry was, like 'On Independence,' of the "pompous, rhetorical, and truly ligneous variety." But he wrote for a performance of Addison's 'Cato' at Portsmouth (1788), an epilogue, the concluding two lines of which are frequently quoted:

"No pent-up Utica contracts your powers;
But the whole boundless continent is yours!"

Sewall was a Federalist, and a "wit" of the time. A volume of his 'Poems' containing paraphrases of Ossian and of Washington's 'Farewell Address' appeared in 1801.

SEWALL, May Wright, American educator: b. Milwaukee, Wis., 27 May 1844; d. 22 July 1920. Graduated from the Northwestern University, Watertown, Wis., in 1866, and was married to Theodore Lovett Sewall (d. 1895) in 1880. She became prominently connected with various woman suffrage associations, lectured extensively on woman suffrage, and served as delegate to numerous congresses in connection with that movement. She was identified as a manager of the Columbian Exposition at Chicago in 1893; was appointed by President McKinley commissioner to the Paris Exposition and its congresses in 1900; and was associated in 1915 with the Panama-Pacific Exposition. She was principal of the Girls' Classical School founded in Indianapolis by her husband until she retired into private life. She published various articles on literary and reform subjects, besides 'Historical Résumé of the World's Congress of Representative Women,' and 'Women, World War, and Permanent Peace' (1916).

SEWALL, Samuel, American jurist: b Bishopstoke, Hampshire, England, 28 March 1652; d. Boston, Mass., 1 Jan. 1730. He was graduated from Harvard in 1671, was ordained to the ministry, but was "diverted into a prosperous and benign secular career," started a printing-press at Boston, and entered public life as a member of the board of assistants. In 1692 he was made a member of the council and judge of the Probate Court, and in the latter capacity joined in the sentence of condemnation against witches at the time of the historic delusion. When he had realized his error he made in 1697 a public confession in church, and afterward spent therefor one day annually in fasting and prayer. He was appointed judge of the Supreme Court of Massachusetts, and from 1718 until his retirement in 1728 was its chief justice. He was possibly the first in America to attack negro slavery, publishing on the subject 'The Selling of Joseph' (1700), a three-page tract of much eloquence. But he is best known for his diary, a garrulous detail of every sort of minutiæ, comparable in this sort to Pepys or Evelyn, and extending from 1674 to 1729. It naturally affords a most valuable source for the political and social history of the colony. In fact, "we have (Chamberlain) no other book like it." Tyler calls Sewall "great by almost every measure of greatness." The diary was printed in volume V of the fifth series of the 'Collections' of the Massachusetts Historical Society.

SEWARD, sū'ard, **Anna,** English poet: b. Eyam, Derbyshire, 1747; d. Lichfield, 25 March 1809. She was a daughter of Thomas Seward, canon of Lichfield, and was known as "the swan of Lichfield." Some of her earlier poetical efforts were an 'Elegy on the Death of Mr. Garrick' and an 'Ode on Ignorance.' Her literary aspirations were fostered by her fellow-townsman, Dr. Erasmus Darwin, of whom she later wrote a 'Memoir' (1804). Her greater success was achieved with a 'Monody on the Death of the Unfortunate Major André' (1781), and an elegiac poem on 'Captain Cook' (1807). Horace Walpole declared she had "no imagination, no novelty," and Miss Mitford spoke of her as "all tinkling and tinsel — a sort of Dr. Darwin in petticoats." Her poems were published in 1810 with a memoir by Sir Walter Scott.

SEWARD, Clarence Armstrong, American lawyer and politician, nephew of W. H. Seward (q.v.): b. New York, 7 Oct. 1828; d. Geneva, N. Y., 24 July 1897. He was graduated at Hobart College in 1848, studied law and practised in New York after 1854. He was judge-advocate-general of New York State in 1856–60; and served as Acting Assistant Secretary of State of the United States after the attempted assassination of Secretary of State Seward in 1865. He was active in the creation of the State of West Virginia; and assisted Judge Blatchford in preparing 'New York Civil and Criminal Justice' (1850).

SEWARD, Frederick William, American lawyer, son of W. H. Seward (q.v.): b. Auburn, N. Y., 8 July 1830; d. 1915. He was graduated from Union College in 1849, admitted to the bar in 1851 and for 10 years was one of the editors and owners of the Albany *Evening Journal*. In 1861 he was sent to apprize Lincoln of the plot to assassinate him in Baltimore, served as Assistant Secretary of State in 1861–69 and in 1877–81, and narrowly escaped death in defending his father from an assault, 14 April 1865. He went with Admiral Porter on the special mission to negotiate the treaties with West Indies in 1867, assisted in the purchase of Alaska, and in the negotiations for Pago-Pago Harbor, Samoa. He was a member of the New York legislature in 1875, State commissioner at the Yorktown Centennial Celebration in 1881 and in 1900 became president of the Sagaponack Realty Company. He published 'Life and Letters of William H. Seward' (1891); 'A West Indian Cruise' (1894), and numerous articles in reviews and magazines.

SEWARD, George Frederick, American diplomat, nephew of W. H. Seward (q.v.): b. Florida, N. Y., 8 Nov. 1840; d. 1910. He was educated at Union College, and in 1861 was appointed United States consul to Shanghai, China, where he remained until 1876, serving as consul-general from 1863. In 1876–80 he was Minister to China, but was recalled in the last-named year in consequence of refusing to undertake the negotiation of a treaty to restrict Chinese immigration. During his residence in China he was active in suppressing riots and in reducing piracy. He was vice-president of the North China branch of the Royal Asiatic Society after 1887, and after 1893 was president of the New York Fidelity and Casualty Company. He published 'Chinese Immigration in Its Social and Economic Aspects' (1881); 'Digest of System of Taxation of New York' (1902), etc.

SEWARD, William Henry, American statesman: b. Florida, Orange County, N. Y., 16 May 1801; d. Auburn, Cayuga County, N. Y., 10 Oct. 1872. He was graduated from Union College (1820), and having studied for the law, began practising at Auburn in 1823, but soon indicated a decided bent for politics, which gradually drew him away from the legal profession. In 1830 he was elected as an anti-Masonic candidate to a seat in the New York senate, and from that date he was, with few intervals, in one form or another, an effective and prominent leader in the councils that framed the policy

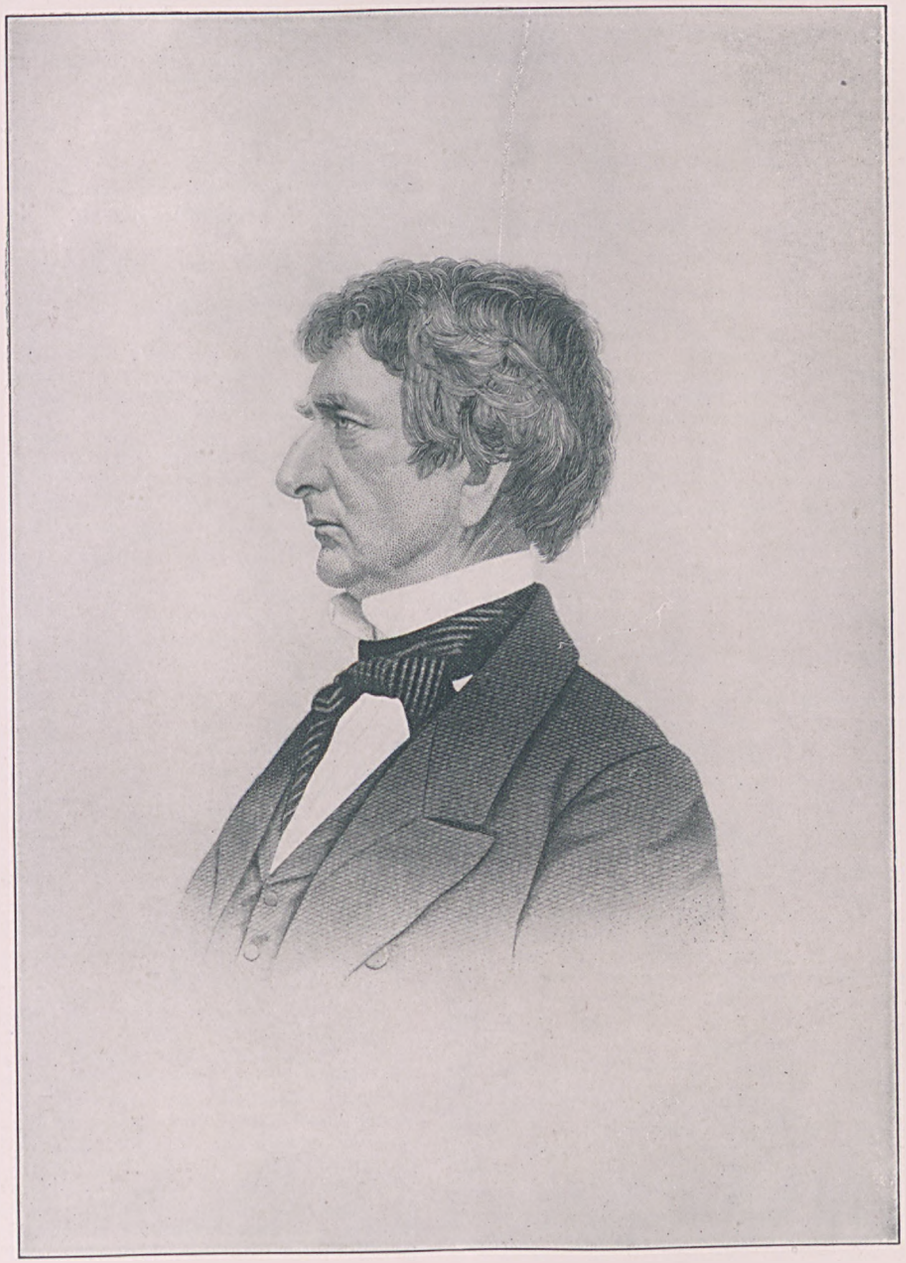
both in his own State and of the nation. In 1838 he was elected first Whig governor of New York by a majority of 10,421. Though his administration was rendered peculiarly difficult by the internal dissensions of his party, it was marked by wise measures of reform, which definitely added to Whig strength in the State. During his term many of the disabilities of foreigners were removed, the anti-rent troubles were adjusted, the natural history and geological survey of the State was commenced, the State museum of natural history was established and a bill was passed securing for fugitive slaves a trial by jury with counsel furnished by the State. He was re-elected in 1840. From 1843 to 1849 he was occupied largely with professional practice, though he delivered several addresses on political and other topics, among them one on the life and character of O'Connell, which is accounted one of his happiest oratorical efforts. He was elected in 1849 to the Senate, and there attained great influence as both a party leader and an adviser of President Taylor. In a speech of 11 March 1850 in favor of the admission of California, he spoke of the exclusion of slavery from all new States as demanded by "the higher law," a phrase which greatly offended Southern Democrats, and was made one of the battle cries of Abolition. Upon Fillmore's accession, Seward strongly opposed that President's pro-slavery attitude, though this was accepted by many Whigs in Congress. Having been re-elected senator in 1855, he took a leading part in the discussion immediately antecedent to the Rebellion. In an address at Rochester, N. Y., in October 1858, he made reference to the "irrepressible conflict" whose outcome must make the United States a nation either all of free labor or all of slave. In 1856 and again in 1860 he was the most prominent Republican candidate for the Presidential nomination, receiving on the first ballot at the Chicago convention in 1860 173½ votes as against 102 for Lincoln, who was eventually chosen. Seward, however, spoke for Lincoln in the West and East, and was made Secretary of State. This post he filled with notable efficiency, particularly in connection with the foreign relations of the government. He reorganized the diplomatic service, and by his able dispatches and the instructions furnished to representatives abroad retained the confidence of Europe, which had been ready to grant recognition and support to the Confederacy. A famous incident of his secretaryship was the correspondence with Great Britain apropos of the "Trent affair." When the Confederate agents, Slidell and Mason, were removed from the British ship *Trent*, their restoration was peremptorily called for and war seemed certain. The answer, formulated by Seward and slightly amended by Lincoln, by its skill, closed the matter. Great Britain, it said, now recognized the principle of exemption from search, contended for in the War of 1812 by the United States, which now, therefore, willingly released the prisoners. Seward insisted on redress for American citizens for depredations by the *Alabama* (see INTERNATIONAL CLAIMS). Secretary Seward firmly asserted the Monroe Doctrine in relation to the French invasion of Mexico, but, by avoiding a provocative attitude, which might have involved his government in a foreign war, was able to defer the decision to a more favorable time. Before the close of the Civil War he intimated to the French government the irritation felt in the United States in regard to its armed intervention in Mexico. Many dispatches on this subject were sent during 1865 and 1866, which gradually became more urgent, until the French forces were withdrawn and the Mexican Empire fell. Seward supported Lincoln's proclamation liberating the slaves in all localities in rebellion, and three years later announced by proclamation the abolition of slavery throughout the Union by constitutional amendment. In the spring of 1865 Mr. Seward was thrown from his carriage, and his arm and jaw were fractured. While he was confined to his couch with these injuries President Lincoln was murdered and on the same evening, 14 April, one of the conspirators gained access to the chamber of the Secretary, inflicted severe wounds with a knife in his face and neck, and struck down his son, Frederick W., who came to his rescue. He negotiated treaties for the purchase of the Danish West India Islands and the Bay of Samoa, which failed of approval by the Senate, and made a treaty with Colombia to secure American control of the Isthmus of Panama, which had a similar fate. Seward sustained the reconstruction policy of President Johnson, and thereby alienated the more powerful section of the Republican party and subjected himself to bitter censure and ungenerous imputations. He opposed the impeachment of the President in 1868, and supported General Grant for the Presidency in the same year. He retired in March 1869, afterward visited Alaska and made a tour of the world in 1870. He negotiated the purchase of Alaska from Russia. He published a 'Life' of J. Q. Adams (1849). An edition of his 'Works' appeared in 1853, including speeches, addresses and essays. His orations and speeches appeared in five volumes (New York 1890) and by order of Congress his official correspondence was published. Consult Bancroft, F., 'Life of W. H. Seward' (2 vols., New York 1899); Hale, E. E., 'William H. Seward' (Philadelphia 1910); Lothrop, T. K., 'William Henry Seward' (in 'American Statesmen Series,' new ed., Boston 1899); Seward, Oliver, 'William H. Seward's Travels Around the World' (New York 1873); Welles, Gideon, 'Lincoln and Seward' (ib. 1874).

SEWARD, Alaska, town on Resurrection Bay, Kenai Peninsula, off the Gulf of Alaska, 340 miles south of Fairbanks, and the southern terminal of the Alaska Northern Railroad. It is important as a winter railroad headquarters. Pop. 1,100.

SEWARD, Neb., city, county-seat of Seward County, on the Big Blue River, and on the Chicago, Burlington and Quincy and the Chicago and Northwestern railroads, about 26 miles west by north of Lincoln, the capital of the State. It is in an agricultural and stock-raising region, in which wheat and corn are the chief farm products. The city has flour mills, grain elevators, stock yards and creameries. There is a large trade in grain and livestock Pop. (1920) 2,368.

SEWARD PENINSULA. See ALASKA.

SEWELL, Jonathan, Canadian jurist: b. Cambridge, Mass., 1766; d. 1839. He was edu-



HON. WILLIAM H. SEWARD

cated at Bristol, England, and in 1785 he settled in Canada. He studied law, was called to the bar in 1789 and engaged in practice at Quebec. He was appointed solicitor-general in 1793, and in 1795 became attorney-general and judge of the Court of Vice-Admiralty. In 1808–38 he was chief justice of Lower Canada. He made the decision concerning the disputed boundaries of Ontario, in 1818. He was president of the executive council in 1808–29; and from 1809 he was speaker of the legislative council. He is said to have made the original proposal for the Canadian federation while in England in 1814. Author of 'Plan for the General Federal Union of the British Provinces in North America' (1815); 'Essay on the Judicial History of French Law so Far as it Relates to the Law of the Province of Lower Canada' (1824).

SEWELL, Robert van Vorst, American artist: b. New York, 1860. He was graduated at Columbia University in 1883, and studied art under Boulanger and Lefebvre in Paris. He was awarded the Hallgarten prize of the National Academy of Design in 1888. He specialized in mural decoration. Among his works are the mural painting 'The Canterbury Pilgrims' in the great hall at Georgian Court, Lakewood; and 'The Story of Psyche,' a series of lunette decorations in the palmroom at the Saint Regis Hotel, New York.

SEWELL, William Joyce, American statesman: b. Castlebar, Ireland, 6 Dec. 1835; d. Camden, N. J., 27 Dec. 1901. He came to the United States in 1851, served as a sailor for a time and later engaged in business. He commanded a brigade at Chancellorsville, where he led a brilliant charge and was badly wounded. He was wounded also at Gettysburg, and served creditably on other battlefields. At the close of the war he was brevetted brigadier-general and major-general. He was interested in railroad affairs after the war; was elected to the New Jersey senate in 1872, and was president of that body in 1876, 1879 and 1880. He was United States Senator from New Jersey in 1881–87 and 1895–1901. In 1899 he became major-general of the New Jersey National Guard.

SEWELLEL, a terrestrial rodent (*Haplodon rufus*) which is formed into a family by itself, and regarded as a connecting link between beavers and squirrels. It is represented by a single species (*H. rufus*), restricted to «a small area on the west coast of North America, in Washington, Oregon and California.» The aborigines called it «Showt'l» or «Sewellel,» the trappers the «Boomer» or «Mountain Beaver.» The animal is plump, with broad head, short limbs and hardly any tail; measures about a foot in length; and has a brownish color. It lives socially in colonies, burrows underground and lives on vegetable matter. It dwells in wet places in which the vegetation is rank and dense. For its winter store it collects great quantities of woody plants and ferns, which it dries thoroughly in the sun before putting in storage for the winter. As a connecting link *Haplodon* is of much interest to naturalists, while the Indians use its skin and also its flesh.

SEWERAGE. See SANITARY ENGINEERING.

SEWICKLEY, Pa., borough in Allegheny County, on the north bank of the Ohio River, 14 miles northwest of Pittsburgh, and on the Pennsylvania Railroad. It is chiefly residential in character as a suburb of Pittsburgh, and is patronized as a summer resort. There are natural gas and petroleum in the district. The borough has a high school, library and hospital. Pop. (1920) 4,955.

SEWING MACHINES. On 17 July 1790 Thomas Saint, an English cabinet-maker, secured a patent on a machine to be used for «quilting, stitching and sewing, making shoes and other articles.» The patent was for some sort of a machine connected with boot-making, and the specifications and drawings of the patent comprised, among other things, a crude stitching device for forming a chain-stitch. This patent was discovered a few years ago by a searcher among the ancient archives of the British Patent Office, where it had lain unnoticed for well-nigh a century, no attempt, so for as is known, having ever been made to introduce into practical use the mechanisms described in the patent. Between 1790 and 1841 several parties obtained patents for stitching devices, making the tambour and chain-stitches, none of which was commercially successful, one of the fatal defects in each being the fact that the cloth had to be fed by hand. When, in 1841, Newton and Archbold patented in England a needle with an eye near the point, in connection with a glove-stitching machine and which is essentially the same needle now in use by all sewing-machine manufacturers, one of the greatest difficulties that had theretofore stood in the way of making the sewing machine a practical success was overcome. In 1818 a sewing machine which made a back-stitch was invented by the Rev. John Adams Dodge, of Monkton, Vt., but was neither patented nor manufactured for sale. The first sewing machine put into operation was patented in France, in 1830, by Barthlémy Thimonnier, and though it was rudely made of wood, nearly 100 of them were collected in a factory used in the manufacture of clothing for the French army. The entire plant was later destroyed by a mob. In 1848 Thimonnier put another machine on the market and on 3 Sept. 1850 took out a patent in the United States. These later machines were made of metal.

A machine having a needle with an eye near the point attached to the end of the vibrating arm was invented and manufactured in 1832–34, in New York, by a machinist named Walter Hunt. This machine was a lock-stitch and used two continuous threads. Hunt sold his idea to a blacksmith named Arrowsmith and through him the combination of the two threads and the needle with the eye near the point became public property. In 1853 Hunt endeavored to patent his idea, but it had been covered by a patent to Elias Howe in 1846. In 1842 a machine for sewing leather and various other heavy materials was invented by J. J. Greenough but this did not become generally used. In 1843 a machine somewhat similar to the Greenough machine was invented by George H. Corliss. This had an automatic feed and the needles, of which there were two, were run horizontally through the goods to be sewed. Numerous other inventions were made between the years 1849 to

1851, the most important of these being the machine for the manufacture of clothing made by Lerow and Blodgett. This had a curved shuttle, ajustable feed and automatic tension and the baster-plate consisted of a circular hoop studded with pins. The next invention patented that covers a fundamental and important feature was that of John Bachelder, patented 8 May 1849. Bachelder's machine was the first to embody the horizontal table with a continuous feeding device that would sew any length of seam. His invention consisted of an endless leather belt set with small steel points projecting through the horizontal table and penetrating the material to be sewed, carrying it along intermittently at a proper time to meet the action of the needle.

Elias Howe, Jr., began his experiments in 1843 and secured his first patents 10 Sept. 1846. Howe's principal improvements were the shuttle, producing the lock-stitch, and the feed motion. Later, Howe made other improvements, but the machine bearing his name was not patented until 1857. Howe's invention consisted of the combination of the eye-pointed needle with a shuttle for forming a stitch and an intermittent feed for holding and carrying the material forward as each stitch is formed. The mechanical device for the feed was called the "baster-plate," and the length of the seam sewed at one operation was determined by the length of this plate. The material to be sewed was hung by pins to the "baster-plate" in an upright position and if the seam to be sewed was of greater length than the plate it was necessary to rehang it on the plate, which was moved back to position in the same manner as a log is carried back and forth in a saw-mill.

In 1847 Allen B. Wilson, then working as a journeyman cabinet-maker in Adrian, Mich., conceived the idea of a sewing machine, although he had never heard of one. He did not complete full drawings of his machine until the latter part of 1848. Early in 1849 he determined to build a model, and began, on 3 Feb. 1849, the construction of his first machine, which he completed in about 60 days. Having been compelled, by lack of means, to construct every part of the machine himself, the iron and steel as well as the wood, although he was not a practical machinist and lacked suitable tools for the metal work, the machine was consequently of imperfect construction and could not illustrate in the best manner the principles of his invention. It worked, however, and with it were made dress waists and other articles that severely tested its capacity. This machine made the lock-stitch, the lower thread being carried by a double-ended shuttle. The machine contained the first automatic feed movement ever produced and was the first that could sew curved seams or turn a sharp angle. Without such a device, the machine would have been a practical failure, as Howe's really was, and as well all others until Mr. Wilson's inventions. His first device was what is known as the "two-motion feed," to distinguish it from his "four-motion feed," a still more effective device afterward invented by him. The "two-motion feed" consisted of a horizontally reciprocating tooth surface (the pitch of the teeth being forward) engaging the material at all times, and while the needle was in the material moving back to take a new stroke. A patent on this machine was granted Mr. Wilson on 12 Nov. 1850. Wilson had, while in New York, come into contact with a Mr. Wheeler who had invented the revolving hook for handling the upper thread below the plate and forming the stitch. He constructed a model of a machine containing a rotary hook and reciprocating bobbin, gave all his energies to perfecting the new machine and obtained a patent for it 12 Aug. 1851. Joined by Newton the three men formed the firm of Wheeler and Wilson.

It is a remarkable coincidence that on the same day a patent was granted to Isaac M. Singer for his first machine. The main features of the Singer machine were its straight needle, working at the extremity of a stationary overhanging arm, and its feed, consisting of a roughened wheel. A straight shaft in the overhanging arm imparted the motion to the needle, and the shuttle was driven in its race below the feed table by a mechanism deriving its motion from the shaft by means of toothed gearing. The feed consisted of an iron wheel with a corrugated surface, the top of which was slightly elevated above the level surface of the table. By an intermittent motion the feed carried the cloth forward between stitches without injury to the fabric. This device permitted the cloth to be turned in any direction by the operator while sewing, which was impossible with the styles of feed which perforated the goods. The material was held in place by a presser foot alongside the needle. This presser foot embraced an important feature possessed by no other sewing machine up to that time—the yielding spring, which would permit of passage over seams, and adjust itself automatically to any thickness of cloth. It was claimed that this was an improvement over Mr. Wilson's first feed, in that there was no backward motion while in contact with the cloth. It had, however, the disadvantage of touching the cloth only on a small portion of its periphery — theoretically at only a point, and practically only a little more. It was claimed by Messrs. Wheeler and Wilson to be really an infringement of Wilson's patent, the principle of which was the holding of the cloth between a roughened or toothed surface on the under side and a smooth surface touching it with an intermittent motion, permitting the turning of the cloth in either direction while the machine was in motion; and this claim was sustained by the court.

On 19 Dec. 1854, a patent was issued for Mr. Wilson's celebrated "four-motion feed," so called from the peculiarity of the device by which the flat-toothed surface of the feed, being in contact with the cloth, is moved forward, carrying the cloth with it; then drops out of contact with the cloth, is moved backward and then rises up against the cloth and is again ready for the first motion. This device solved the problem of a thoroughly practical and effective feed, and was soon generally adopted and has become the feed motion of all makes of sewing machines. This feed motion, although it was not patented until this late date, had been long previously invented by Mr. Wilson, and was described in his application for a patent in 1851, but the claim was not pursued for the reason that he believed at the time that he had been anticipated by W. O. Grover, of the firm of Grover and Baker. It was ascertained afterward, however, that Mr. Wilson was really prior in the invention, and, without contest on the part of Mr. Grover, the patent was granted to Mr. Wilson. This machine was invented by Grover and Baker on 11 Feb. 1851 and had a double-loop stitch made by a combination of a circular reciprocating under needle and a curved upper needle with an eye near the point. This eliminated both shuttle and bobbin and rendered it possible for the upper and under threads to be taken from commercial spools. These machines, though once popular, are not now manufactured.

In 1855 litigation arose involving the three principal sewing-machine companies then in existence, each claiming that the others were infringing upon certain of their patent rights, and numerous suits were instituted, more particularly by Howe, whose patents were so skilfully drawn that he claimed all others were infringements.

In 1856 the three principal sewing-machine companies — Wheeler and Wilson, Singer and the Grover and Baker — formed a combination. It was contracted by the three companies and Mr. Howe that they would stop their litigation, and, with a fair payment to each other and to Mr. Howe for special rights, would carry on the business with only honorable competition. They finally agreed to license any responsible person who should propose to engage in the manufacture of a good machine on the payment of a royalty, which for several years was $3 on a machine.

The next machine to be put on the market was the Willcox and Gibbs. This machine, which had a rotating hook for using a single thread to make the twisted loop-stitch, was first patented in June 1857 by James E. H. Gibbs, a farmer of Millpoint, Va. Later James Willcox, of Philadelphia, added some further improvements, and the machine then became known as the Willcox and Gibbs. Several years afterward an automatic tension was placed on this machine by Charles H. Willcox.

While the manufacture of machines for the home has been developing and progressing, those for manufacturing purposes have in no less a degree been brought to a state bordering on perfection. The most recent development is the oscillating shuttle machine of the Singer Company which makes up to 50 stitches per second with scarcely any apparent friction. The single thread chain-stitch machine is faster than the double thread lock-stitch, making up to 4,000 stitches per minute. There are now machines for making — or which have special attachments for making — every conceivable article of clothing, upholstery, embroidery, leather goods, etc. We have the button-hole, the button-sewer, the French-knot, the faggoting, feather-stitching, hemstitch, side and box-plaiters, corset machines; the cylinder for seam work on sleeves, trousers, bootlegs, leather buckets, etc.; machines for embroidery, smocking, carpet, awnings, tents, etc.; the single and double-needle machines and those with four, six and eight needles for glove work, special machines for overalls, sail-making, flag-making and a host of others too numerous to mention. A special class known as high-speed machines is used in factories where clothing is made in quantity. They are run by individual dynamos. Many of the machines may be used for several different purposes by simply changing the style of feed motion, presser foot, needle, etc., while the other parts of the mechanism remain substantially the same. There have been several thousand patents granted on sewing machine appliances and attachments.

The production of sewing machines has become a wonderful industry in the United States, which leads the world in their manufacture. In 1914 there were 46 concerns engaged in the industry, capitalized at $34,446,624; employing 14,308 wage-earners, with wages of $8,860,843; cost of material used, $7,359,664; and the value of their production was $21,391,917. Besides these there were 4 establishments making sewing-machines cases, with an invested capital of $6,425,153 and employing 3,699 hands; producing goods annually to the value of $5,845,663. In the same year the exports of sewing machines with and without cases amounted to $8,658,762. Consult Hasluck, P. N., 'Sewing Machines: Their Construction, Adjustment and Repair' (London 1905).

SEX IN PLANTS. See PLANTS, SEX IN.

SEXAGESIMA (sĕks-a-jĕs'ĭ-ma) **SUNDAY,** the second Sunday before Lent. See QUINQUAGESIMA.

SEXTANT, a portable instrument for measuring the altitudes of the heavenly bodies above the horizon, or their angular distance as seen in the sky. It was invented independently by Thomas Godfrey, of Philadelphia, and Captain Hadley of the British navy, about 1730. The principles on which it works will be seen by a study of Fig. 1. C is a plain flat mirror, of which the polished side is turned downward

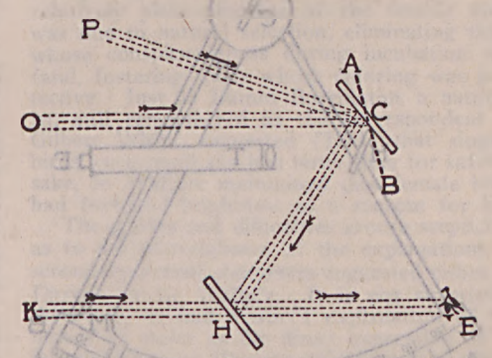


FIG. 1.

and toward the left. H is a flat plate of polished glass through which an eye placed at E may view a distant object in the direction K by light coming through it in the direction of the dotted lines. Light emanating from another object O or P and falling on the mirror C will, where the mirror is properly directed, be reflected along the line CH and, in striking the glass plate H, a certain portion of it will be reflected in the direction HE, so that the observer with his eye at E will see both the objects K and O or P in coincidence. If the mirror C is set parallel to H as in the figure, the rays KE and OC will be parallel, and may, therefore, be considered as emanating from the same object at an infinite distance.

Thus the eye will see two images in the mirror as if together. But if the mirror C be moved into a different direction, that shown by the dotted line AB for example, the direction of the ray, the direction of the line PC, the rays along which are reflected to H, will deviate from OC by double the angle through which the mirror has turned. This doubling is caused by the fact that the angles of incidence and reflection are both changed by the motion of C. It follows that if the observer can measure the angle between the mirror C and H, doubling this angle will give him the difference of direction between the rays coming from K and from P.

The sextant is used to measure this angle. The essential parts of it are shown in Fig. 2. The part ABC consists of the arc AB round C as a centre and firmly fastened by the radii CB and CA which are again firmly connected by a framework not shown in the figure. To this framework is attached the fixed plate of glass H, of which the lower half is silver while the upper half is transparent. T is a telescope, also firmly fixed to the frame, through which the eye looking in at E may see a distant object through the transparent portion of the mirror, and at the same time see any other object by the light reflected from the silvered part. The arc AB is graduated to degrees and fractions as shown by the figures. Owing to the doubling of the angle, the measures on the arc BA are also double. That is to say, this arc is only 60 degrees in length, but is divided into 120 degrees, so as to show the actual altitude of the object observed.

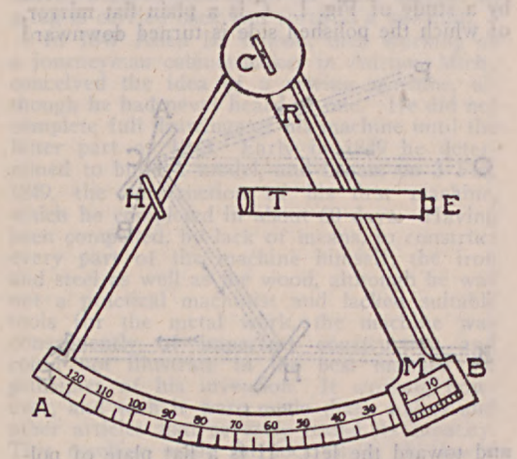


FIG. 2.

RM is a movable arm carrying a mirror C called the index glass, fixed to it perpendicularly at its upper end. The arm revolves around C as a centre. At its lower end there is an index mark and vernier by which the position of the arm with respect to the graduations on the arc may be determined.

The altitude of a heavenly body at C is then measured by the observer taking the instrument in his hand and holding it in a vertical position, with the telescope ET horizontal, so that the sea horizon may be seen through the transparent part of the horizon glass H. The observer facing in the vertical plane of the sun or other object then turns the arm RM around the centre C until he brings the sun into sight, through its rays being reflected first from C and then from H. When the limb of the sun is thus made to coincide with the horizon, the angle through which the arm RM has moved from parallelism is shown by the position of the index on the graduated arc BA, which is then determined by the vernier.

In ordinary use the navigator never has to measure angles exceeding 90 degrees. In this case the arc BA need only to be 45 degrees in actual length. The instrument is then called a quadrant. This was the original form used by Hadley.

For very accurate use the arc is extended down so as to form a complete circle. A special device is employed to bring about the proper reflection of the light; but the reflecting circle, as the instrument is called, is too complicated to admit of common use by the navigator.

SIMON NEWCOMB.

SEXTET (from Lat. *sextus,* sixth). *In music,* a composition for six voices or instruments, or for voices with instrumental accompaniment. Instrumental sextets are generally compositions in sonata form.

SEXTON, Alexander Humboldt, English metallurgist: b. London, 11 Sept. 1853. He was educated at the Royal School of Mines, London, the Royal College of Science, Dublin, and at the universities of Glasgow and Edinburgh. He was lecturer on chemistry and metallurgy at the Manchester Technical School in 1882–84; and from 1884 until 1909, when he retired, he was professor of metallurgy at the University of Glasgow and at the West of Scotland Iron and Steel Institute. Author of 'Elementary Chemistry'; 'Fuel and Refractory Materials'; 'Alloys'; 'Chemistry of the Materials of Engineering,' etc.

SEXTON, Frederick Henry, Canadian engineer and educator: b. New Boston, N. H., 9 June 1879. He was educated at the Massachusetts Institute of Technology and was professor of metallurgy there in 1901–02. He was assistant professor of mining and metallurgy at Dalhousie University, Halifax, Nova Scotia, in 1903–07; and since 1907 has been president of the Nova Scotia Technical College. Since 1916 he has also had charge of the vocational training school for returned soldiers of the Quebec and Maritime provinces. He is author of many technical papers.

SEXTON, a church officer whose duties consist in taking care of the church generally, to which used to be added the duty of digging and filling up graves in the churchyard, when the church had a cemetery attached to it. In the United States the sexton is also very often an undertaker, and thus continues in a form different from the old-time sexton, to attend to the interment of church members. The term sacristan, of which sexton is a corruption, applies more particularly to an official in the Roman Catholic and Anglican churches, who has charge of the sacristy and its contents, and of the vestments worn during the service. He occupies a considerably higher rank than the ordinary sexton, and in English cathedrals is often a minor canon

SEXTUS (surnamed EMPIRICUS, from his belonging to the empiric school of medicine) was a sceptic who flourished in the first half of the 3d century. He was a Greek by birth, and lived at Alexandria and Rome. Scepticism appears in his writings in the most perfect state which it reached in ancient times. (See SCEPTICISM). We have two works by him, written in the Greek language, and they are the source of our knowledge of the Greek sceptical philosophy. One of them entitled 'Outlines of Pyrrhonism' in three books, explains the method of Pyrrho; the other, entitled 'Against the Mathematicians,' is an attempt to apply that method to all the prevailing philosophical systems and other branches of knowledge. Consult the edition of his works by J. A. Fabricius (Leipzig 1718) and by Bekker (Berlin 1842); also Brochard, 'Les sceptiques grecs' (Paris 1887); Christ-Schmid, 'Geschichte der griechischen Literatur' (Vol. II, pt. 2, Munich 1913) and Pattrick, 'Sextus Empiricus and the Greek Sceptics' (Cambridge 1899).

SEXUAL SELECTION, a term invented by Darwin to denote a special phase of natural selection, depending on a competition between rival males, in which a premium is set on those qualities which favor their possessors in securing mates. This competition takes two forms: On the one hand, rival mates, for instance, stags or gamecocks, fight with one another and the conquerors have naturally the preference in mating; on the other hand, rival males sometimes seem to vie with one another in displaying their attractive qualities before their desired mates, who, according to Darwin, choose those that please them best. Darwin gives the following summary of his theory:

"It has been shown that the largest number of vigorous offsprings will be reared from the pairing of the strongest and best-formed males, victorious in contests over other males, with the most vigorous and best-nourished females, which are the first to breed in the spring. If such females select the more attractive and, at the same time, vigorous males, they will rear a larger number of offspring than the retarded females, which must pair with the less vigorous and less attractive males. So it will be if the more vigorous males select the more attractive and, at the same time, healthy and vigorous females; and this will especially hold good if the male defends the female, and aids in providing food for the young. The advantage thus gained by the more vigorous pairs in rearing a larger number of offspring has apparently sufficed to render sexual selection efficient."

In regard to the second aspect of sexual selection, in which the females are believed to exercise some choice, giving the preference to those suitors which have brighter colors, more graceful forms, sweeter voices or greater charms of some kind, there is no little difference of opinion. Darwin indeed believed strongly in the female's choice and referred to this process of selection many of the qualities which distinguish male animals. The females "have by a long selection of the more attractive males added to their beauty or other attractive qualities." On the other hand, Alfred Russel Wallace maintains a very different position. "There is," he says, "a total absence of any evidence that the females admire or even notice the display of the males. Among butterflies there is literally not one particle of evidence that the female is influenced by color or even that she has any power of choice, while there is much direct evidence to the contrary." Against this, G. W. and E. G. Peckham, in their careful essay on sexual selection in spiders, state that they have in the *Attidæ* "conclusive evidence that the females pay close attention to the love dances of the males and also that they have not only the power, but the will, to exercise a choice among the suitors for their favor." Some observers of birds are also confident that the females choose the more musical or otherwise attractive males. But again Wallace maintains that the fact that every male bird finds a mate "would almost or quite neutralize any effect of sexual selection of color or ornament; since the less highly colored birds would be at no disadvantage as regards leaving healthy offspring."

The theory of sexual selection is of considerable importance in a general theory of evolution. This may be illustrated in reference to the bright plumage of many birds. If we postulate successive crops of variations (which cannot at present be completely rationalized), if we acknowledge that there is really "preferential mating" among birds (which is not readily proved or disproved), if we believe that the females are sensitive to the slight excellences which distinguish one suitor from another and that their choice of mates is determined by these excellences (which Wallace emphatically denies), then we may say that the greater brightness of male birds may have been evolved by sexual selection. This was Darwin's opinion. The brighter males succeeded better than their rivals in the art of courtship; the variations which gave them success were transmitted to the offspring; gradually the qualities were established and enhanced as secondary sexual characters of the species. But Wallace interpreted the facts quite otherwise. The relatively plain plumage of the female birds was due to natural selection, eliminating those whose conspicuousness during incubation was fatal, fostering those whose coloring was protective. Just as Daines Barrington, a naturalist, still remembered as the correspondent of Gilbert White, suggested (1773) that singing birds were small and hen birds mute for safety's sake, so Wallace maintained that female birds had forfeited brightness as a ransom for life.

The doubts and difficulties arouse scepticism as to the thoroughness of the explanations of secondary sexual characters suggested either by Darwin or by Wallace. It is not surprising, therefore, to find Mivart's explanation of the beauty of males as the direct expression of an internal force, or Mantegazza's hints as to physiological explanation of the sexual divergence, or Brook's reference to "something within the animal which determines that the male should lead and the female follow in the evolution of new breeds." Geddes advanced further, endeavoring to interpret the secondary sexual characters as outcrops of the relative preponderance of anabolism and katabolism characteristic of females and males respectively. Gay coloring — sometimes at least due to pigmented waste products — is regarded as a characteristic expression of the predominantly katabolic or male sex and quiet plainness is equally natural to the more anabolic females. But this theory, which seeks to rationalize the variations which Darwin simply postulated, is by no means inconsistent with a recognition of sexual selection as an accelerant directive process in the evolu-

tion of male brightness, or of natural selection as a retardative directive process eliminating disadvantageously conspicuous females.

Wallace in his later works advanced toward a rational interpretation of the variations which he was previously content to postulate as facts. For he says that "ornament is the natural outcome and direct product of superabundant health and vigor," and is "due to the general laws of growth and development." It seems to some that this mode of interpreting characters is of far-reaching importance and that it affects not only the theory of sexual selection but that of natural selection as well.

To sum up, the problems involved in sexual selection are (1) what physiological conditions explain the secondary sexual characters which so often distinguish males and females; (2) to what extent and in what degree of refinement does preferential mating occur; and (3) to what extent has sexual selection guided the differentiation of the sexes alike in distinctive qualities and in æsthetic sensitiveness? Before these problems can be adequately solved many more facts must be accumulated.

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SEYCHELLES, sā-shĕl', a group of islands in the Indian Ocean, belonging to Great Britain. Their formation is peculiar, as they are the only tropical islands of granite structure. The archipelago comprises 80 islands, rising precipitously from the water to a height of 2,998 feet in the largest of the group, Mahé, which has an area of 55½ square miles. Smaller islands of the group are Praslin, Silhouette, La Digue, Curiense and Felicité. Formerly the group was administered from Mauritius but in 1888 the office of administrator was created, an executive council of two ex officio members and one nominated member was appointed and a legislative council of six members. In 1915 the revenue was $127,000, the expenditure $155,500 and the debt $60,000. Exports in 1915 were valued at $462,340 and imports at $280,000. Mahé is central and, with a few of the others, is inhabited. The white sandy beaches are enclosed by coral reefs. The soil is fertile, the climate temperate. There are many brooks and streams. The islands are covered with verdure (enormous ferns, sensitive plants and palms grow) and valuable woods, adapted to cabinet work or shipbuilding. Vanilla, coffee, cocoa, spices, tobacco, corn, tropical fruits and vegetables are grown. The exports are the fibres, nuts and oil of the cocoanut palm; vanilla, soap, tobacco, tortoise-shell and vacoa bags. The imports are cotton, coal, wine, coffee and cotton goods. Coco-de-mer (q.v.) is peculiar to Praslin. Enormous tortoises of the edible sort are common. The adjacent seas contain numerous fish, some of gorgeous colors. The inhabitants construct their homes of a species of coral which glistens like marble and is hewn into massive blocks. The chief harbor is Port Victoria, on Mahé Island. There is much land suitable to, but not as yet under, cultivation. The Seychelles were discovered by the Portuguese and first colonized by the French (1743), of whom the present inhabitants are descendants. The British captured the islands in 1794 and at the peace of 1814 they were ceded to them. Pop. about 24,000. Consult Belcher, E., 'Account of the Seychelles'; Fauvel, A. A., 'Bibliographies des Seychelles' (1908); Gardiner, J. S., 'The Seychelles'; Hartman, 'Madagascar und die Inseln Seschellen' (Leipzig 1886).

SEYCHELLES COCOANUT, a palm (*Lodoicca sechellarum*), peculiar to the Seychelles Islands, sometimes 100 feet high, crowned by immense palmate leaves, which make good material for hat plaiting and basketry, and when mature are used for house partitions and for thatching. The fruits are gigantic in size, sometimes weighing as much as 50 pounds and were anciently supposed to grow on submarine palms, since they were found only when washed ashore on Asiatic coasts. This circumstance caused many superstitions to arise, especially that they were a powerful cure for snake poison, and they, therefore, commanded high prices in the East and were called coco-der-mer, sea, double or Maldive cocoanuts. There are from one to four stony nuts in a husk, each being deeply lobed at each end. This floating apparently double nut may have given rise to the types of twin boats. The unripe fruit is edible and the hard black shell of the nuts is carved into ornaments and fakers' drinking cups. See PALMS.

SEYFFARTH, zī'färt', **Gustave,** American educator and Egyptologist: b. Uebigau, Saxony, 13 July 1796; d. New York, 17 Nov. 1885. He was educated at the University of Leipzig and under Champollion in Paris. He was professor of Oriental archæology at the University of Leipzig in 1825–55, afterward emigrating to the United States. He was professor of archæology and exegesis at the Concordia Lutheran Theological Seminary, Saint Louis, in 1855–71. He then retired and lived in New York. He was a lifelong student of Eygptology and made many translations. Author of 'De Sonis literarum græcarum tum genuinis tum adoptivis libri duo' (1823); 'Systema Astronomiæ Ægyptiaceæ' (1833); 'Theologische Schriften der Alten Aegypter' (1855); 'Summary of Recent Discoveries in Bible Chronology' (1857); 'Chronologia Veterum' (1871), etc.

SEYMOUR, sē'mōr, a noble English family of Norman origin. Their name is corrupted from Saint Maur, their seat in Normandy. They acquired lands in Monmouthshire in the beginning of the 13th century and early in the 15th century added to these estates others in Somersetshire. The first member to become conspicuous was Sir John Seymour, the father of the third wife of Henry VIII and of Edward Seymour, protector of the realm of England during the minority of Edward VI, whose uncle he was. He commanded in a maritime expedition against the Scots in 1544, when he landed a body of troops at Leith and set fire to the city of Edinburgh. By the will of Henry he was nominated one of the council of regency during the minority of Edward VI; but, not content with his share of power, he procured himself to be appointed governor of the king and protector of the kingdom (January 1547). In the month following he obtained the post of lord-treasurer, was created first Duke of Somerset and made earl-marshal. The same year he headed an army, with which he invaded Scotland, and after having gained the victory of Musselburgh returned in triumph to England. His success excited the jealousy of the Earl of Warwick and others, who procured his confinement in the Tower. Six months after he obtained a full pardon from the king and was ostensibly reconciled to his adversary, Lord Warwick. The reconciliation was probably insincere, as Warwick caused Somerset to be again arrested, in October 1551, on the charge of treasonable designs. He was tried, found guilty, attainted and beheaded on Tower Hill in January 1552. His eldest son by his second wife was created by Elizabeth, Earl of Hertford. The Earl of Hertford under Charles II having distinguished himself in support of the royal cause during the Parliamentary war obtained in his favor the revival of the title of Duke of Somerset and took his seat in the House of Lords as second duke in 1660. On the extinction of his line the descendants of the first Duke of Somerset by his first wife claimed the title and on the advice of the attorney-general that claim was pronounced good by the House of Lords, in which body the descendants of that claimant still hold a place. Consult Locke, A. A., 'The Seymour Family' (London 1911) and St. Maur, R. H., 'Annals of the Seymours' (ib. 1902).

SEYMOUR, George Franklin, American Protestant Episcopal bishop: b. New York, 5 Jan. 1829; d. Springfield, Ill., 8 Dec. 1906. He was graduated from Columbia in 1850, from the General Theological Seminary in 1854 and ordained in the priesthood in 1855. He held various charges in New York State, founded Saint Stephen's College at Annandale, N. Y., in 1855 and was its warden until 1861. In 1865–79 he was professor of ecclesiastical history at the General Theological Seminary, of which he was also dean in 1875–79, and in 1878 he was consecrated first bishop of Springfield. In 1897 he represented his church at the Congress of Old Catholics at Vienna. He published 'What is Modern Romanism' (1885); 'Marriage and Divorce' (1893); 'The Church Idea of the Family' (1899); 'Sacraments and Principles of the Church' (1903), etc.

SEYMOUR, Horatio, American statesman: b. Pompey Hill, Onondaga County, N. Y., 31 May 1810; d. Utica, N. Y., 12 Feb. 1886. He was educated at Geneva Academy (now Hobart College) and at a military school at Middletown, Conn.; studied law at Utica and was admitted to the bar in 1832. In 1833 he became military secretary to Governor Marcy and held the position six years. He was elected to the State assembly by the Democrats of Oneida County in 1841; was mayor of Utica in 1842; re-entered the assembly in 1843 where, as chairman of the committee on canals, he outlined the policy subsequently followed by the State. He was chosen speaker in 1845 and nominated for governor in 1850, was defeated by Washington Hunt, but in 1852 was elected by a large majority. During his term a prohibition law was passed by the legislature and was vetoed by him as unconstitutional. The strong temperance sentiment prevalent at the time made his act very unpopular. During the term of his successor the vetoed law was again passed by the legislature, but was declared unconstitutional by the Court of Appeals. He was again elected governor in 1862 and made an unequivocal declaration in favor of the supremacy of the Constitution and the restoration of the Union, though he denied that the war was the unavoidable result of slavery, or that slavery should be abolished in order to restore the Union. In July 1863 serious riots broke out in New York, involving loss of life and destruction of property. These were caused by the draft-law which discriminated against New York City in the allotment of quotas. The governor's complaint to the President secured an investigation which resulted in procuring a correction of the errors of the enrolment. In 1868 he was nominated for the Presidency, but was defeated by Ulysses S. Grant, receiving 80 electoral votes to the 214 cast for Grant. Consult Croly, 'Seymour and Blair: Their Lives and Services' (New York 1868); Hartley, 'Horatio Seymour' (Utica 1886).

SEYMOUR, Lady Jane, queen of England: b. England, about 1509; d. Hampton, 24 Oct. 1537. She was the eldest child of Sir John Seymour and sister of Edward, Duke of Somerset and Protector of England. She became the third wife of Henry VIII (q.v.) and the mother of Edward VI (q.v.). She was the first maid of honor to Anne Boleyn, whom she supplanted in 1536, and favored the Protestant Reformation. Consult Hume, Martin, 'The Wives of Henry the Eighth and the Parts They Played in History' (Edinburgh 1905).

SEYMOUR, Thomas Day, American classical scholar: b. Hudson, Ohio, 1 April 1848; d. 31 Dec. 1907. He was graduated at the Western Reserve College in 1870 and later studied at the Universities of Leipzig and Berlin. He was professor of Greek at Western Reserve College in 1872–80; and chairman of the managing committee of the American School of Classical Studies, Athens, Greece, in 1887–1901. He edited the 'College Series' of Greek authors and was American coeditor of *Classical Reviews.* Author of 'Selected Odes of Pindar' (1882); 'Introduction to the Language and Verse of Homer' (1885); 'Introduction and

Vocabulary to School Odyssey, Eight Books' (1897); 'School Iliad, Six Books' (1889–1901), etc.

SEYMOUR, Thomas Hart, American legislator and diplomat: b. Hartford, Conn., 1808; d. there, 3 Sept. 1868. He was educated at a military academy at Middletown, Conn., became a lawyer at Hartford and was editor of *The Jeffersonian Democrat* in 1837. He was a member of Congress in 1843–45, served through the Mexican War, rising to the rank of colonel, and in 1850–53 was governor of Connecticut. He was Presidential elector in 1852; was United States Minister to Russia in 1853–57 and during the Civil War acted as leader of the Connecticut Peace Democrats, in which connection he lost much of his popularity. In 1862 the State senate voted that his portrait, with that of Isaac Toucey, should be removed from the chamber till the comptroller should be satisfied of his loyalty. In 1863 he was again a candidate for governor but was defeated by W. A. Buckingham after an exciting contest.

SEYMOUR, Truman, American soldier: b. Burlington, Vt., 25 Sept. 1824; d. Florence, Italy, 30 Oct. 1891. He was graduated from West Point in 1846, fought in the Mexican War and was brevetted captain. In 1850–53 he was assistant instructor at West Point, served in the Seminole War of 1856–58, and under Major Anderson at the defense of Fort Sumter in 1861, receiving the brevet of major in recognition of his services. He became chief of artillery in McCall's division of the Army of the Potomac in 1862 and was commissioned brigadier-general of volunteers. He was engaged in the Virginia and Maryland campaigns, was in command of a division at Malvern Hill, Manassas, South Mountain and Antietam, receiving rank of brevet colonel. As chief of staff to the commanding general of the Department of the South in 1863 he led a division on Folly Island, took part in the attack on Morris Island and commanded the unsuccessful assault of Fort Wagner on 18 July, in which he was severely wounded. He commanded a brigade in the battle of the Wilderness, was taken prisoner, and after his exchange in the following August was in command of a division in the Shenandoah Valley, and was engaged in the operations around Petersburgh until the close of the war. He was present at Lee's surrender. He was brevetted major-general of volunteers and brigadier-general in the regular army, and in 1865 was mustered out of the volunteer service. He became major of artillery in 1866 and served in command of various forts until his retirement in 1876. After his retirement he resided in Europe, mostly in Florence.

SEYMOUR, Conn., town in New Haven County, near the junction of Bladen, Little and Naugatuck rivers, and on the New York, New Haven and Hartford Railroad, nine miles northwest of New Haven. Seymour is one of the oldest towns of Connecticut. The manufacturing of woolen goods was begun here the last of the 18th century. In 1803 Gen. David Humphreys (who was the first to bring merino sheep into the United States) bought the woolen mill and enlarged it to what was then called a large factory. In 1836 the place was incorporated under the name of Humphreysville, and in 1850 it was incorporated as a town under its present name. The chief manufactures are woolen goods, mechanics' tools, agricultural implements, nails, pins, paper, submarine cables, fountain pens, bicycle parts and rubber. There are five churches, a high school, public graded schools, private schools and a public library. Pop. 6,781. Consult Sharpe, 'History of Seymour' (Seymour 1902).

SEYMOUR, Ind., city in Jackson County, on the Pittsburgh, Cincinnati, Chicago and Saint Louis, the Baltimore and Ohio Southwestern, the Chicago, Terre Haute and Southeastern, I. P. S. Traction Company and I. and I. Traction Railway Company, about 60 miles south of Indianapolis and 50 miles north of Louisville, Ky. It is an agricultural and stock-raising region and has considerable manufacturing interests. The chief industrial establishments are woolen mills, grain cradle and tool factory, large flour mills, hominy mill, chair factories, furniture factory, several commercial printing plants, harness factories, carriage factory, shirt factory, planing mills and other woodworking establishments, ice and cold storage plant, ice cream plant, bottling works and creamery. This being a division of the Baltimore and Ohio Southwestern, a great many railroad people are employed and live here. There are 11 churches, four ward public schools, Shields High School, Catholic and Lutheran parochial schools, two national banks, capital $100,000 each, and one trust company, capital $60,000. Pop. 7,348.

SFAX, sfäks, Tunis, a town on the east coast, on the Gulf of Cabes, opposite Kerkenna Island. It is strongly fortified and surrounded by gardens and villas. The European, Arab and French portions are the three distinct divisions of the town. The first modern, the second—in the central portion—walled and entered by two gates; the third, a camp. Sfax is an important seaport, with a considerable trade in dates, olive-oil, wool, fruits, sponges, grasses, etc.; cotton, woolen and silk goods are manufactured. A safe harbor and a railway connecting with the interior are modern features. The harbor is provided with a repair dock and slips for fitting and repairing the sponge and fishing vessels. Sfax was occupied in the 12th century by the Sicilians, and in the 16th century, for a brief period, by the Spaniards. One of the principal events of the conquest of Tunis by the French was the bombardment of the town in 1881. Pop. 45,000.

SFORZA, sfôrt'sä, a celebrated Italian house, which played an important part in the 15th and 16th centuries, gave six sovereigns to Milan and formed alliances with most of the princely houses of Europe. The founder of the house was a peasant of Cotignola in Romagna, GIACOMUZZO (Giacomo or Jacopo Muzio) ATTENDOLO: b. Cotignola, in the Romagna, 10 June 1369; d. 4 Jan. 1424, whose skill and courage made him one of the most powerful condottieri of Italy. His surname of Sforza (the forcer), which vouches for his great strength, he is said to have received from Alberigo Barbiano, the true founder of the condottiere mode of warfare in Italy. He served in the wars in the papal states, in Tuscany and in Naples, and died as Grandconstable of Naples. His son FRANCESCO: b. 25 July 1401; d. Milan, 8 March 1466, received the command of the Milanese forces in the war against Venice. In 1447 he laid claim to the states of Milan in virtue of his wife, although she was only the natural daughter of the last duke, and to enforce his claim concluded a treaty with Venice, and advanced against Milan. He laid siege to the city in 1449, and on 3 March 1450 it was forced by famine to surrender. His son GALEAZZO MARIA: b. 24 Jan. 1444; d. 26 Dec. 1476, a barbarian and a voluptuary, was murdered by conspirators. The son of Galeazzo, GIOVANNI GALEAZZO: b. 1468; d. 1494, never actually ruled. Till 1480 he was subject to the guardianship of his mother and her minister, Checco Simonetta. The latter was then beheaded by his uncle Lodovico, surnamed the Moor, in 1481. Lodovico then assumed the government himself and kept his nephew virtually a prisoner in the castle of Pavia. At a subsequent period he joined the league against France, and was on that account deposed by Louis XII (1500). He was taken to France where he died. His son MASSIMILIANO: b. 1491; d. 1530, once more drove the French from his territories by the aid of the Swiss, but in consequence of the battle of Marignano was obliged to cede his dominions to Francis I (1515) in consideration of a pension. The remainder of his life was spent in France. Francis was afterward driven from Italy by the Emperor Charles V, who invested FRANCESCO: b. 1492; d. 24 Oct. 1535, brother of Maximilian, with the duchy of Milan in 1522. On the death of Francesco in 1535 Charles V conferred the duchy on his son Philip II, king of Spain. Consult Ady, C. M., 'History of Milan under the Sforza' (New York 1907); Corio, 'Historia di Milane' (1565); Verri, 'Storia di Milane' (1851); Hallam, 'View of the State of Europe during the Middle Ages' (1818); Magenta, 'Gli Visconti e gli Sforza' (Milan 1883).

SGAMBATI, zgam-bä'tē, **Giovanni,** Italian musician: b. Rome, 28 May 1843; d. 14 Dec. 1914. He studied at Trevi, Umbria, and in 1860 removed to Rome. There he gained the friendship of Liszt, whose teaching and influence were of inestimable benefit to him. He became known as a conductor, composer and pianist, and as an interpreter of German music in Italy. He was professor of pianoforte at the Academy of Saint Cecelia from 1877; and in 1897 he founded the Nuova Societa Musicale Romanà. His pianoforte pieces won wide success and he also composed a requiem mass, three symphonies, several concertos, overtures and organ pieces.

SGANARELLE, zgą'nạ'rĕl', a comic character in ancient comedies, frequently used by Molière, with whose plays he is generally associated. He is introduced by Molière in 'Siganarelle, ou le cocu imaginaire' (1660). He appears also in 'Don Juan, ou le festin de Pierre' (he is Leporello in the opera 'Don Giovanni'); and in 'L'Amour d'médicin'; 'Le médecin malagre lui'; 'Le mariage forcè,' and others. The character as handled by Molière is the source of many popular proverbs.

SGRAFFITO (sgräf-fē'tō) **DECORATION,** that which is produced by means of scoring or scratching on a comparatively soft surface. It is like engraving in all respects except in the relative hardness of the material and the delicacy of the work. There is only one peculiarity in it which is different in nature from the effect produced by engraving, and that is the producing of color effects by scratching through an outer surface so as to show an inner surface of a different hue or tint. Even in this respect it is like a very delicate art of incision, namely, the Japanese method of cutting through different layers of colored lacquer so as to produce decorative patterns. It is also in this respect like the art of cameo-cutting when applied to onyx in layers of black and white, or a similar stratified material.

Sgraffito decoration, in the usual sense, is of two kinds: first, that which is applied to plaster surfaces, as of the outer faces of walls; and, secondly, to clay surfaces, as where an earthen pot is scored with a hard point before it is fired. In both of these departments sgraffito decoration is one of the earliest methods applied; and in pottery we have in our museums pieces of prehistoric and primitive work of great interest, while also the art seems one never wholly abandoned when pottery is made cheaply and quickly by people who care for decorative effect. The sgraffito decoration of plaster walls is, however, limited in application to a few epochs of European history. It has never been out of use in Italy since the Middle Ages, and occasionally a new building, even of some pretensions, is adorned in this way, or a monument of the past is carefully restored, with its sgraffito decoration repaired and completed. In the northern lands of Europe the severity of the weather is a partial check on the employment of the art; but the main reason for its neglect is the modern desire for smoothness, finish and completeness of all sorts, with which the sgraffito process may be thought to be inconsistent. It is clear that a house faced with brown plaster which is deeply scored to show line of black and white plaster from below will not meet the requirements of a community respecting nothing which has not the look of expense and deliberation. The effects, however, are very spirited and artistic, and it is a pity that the process is not used for inexpensive building. Consult Opitz, 'Sgraffito' (1891).

SHABATZ, shä'bạts, **SHABATS,** or **SABAC,** Jugo-Slavia, town, capital of the Drina department, on the river Save, 35 miles west of Belgrade. It has a castle dating from 1470, is the seat of a bishop, of the district prefecture and of a tribunal. The town is the commercial centre of the surrounding country, and exports honey, prunes, grain, cattle and hogs. It suffered considerably as the scene of active fighting in the European War. Pop. 12,072.

SHABUOTH, a Jewish feast, known also as the Festival of the Weeks; the most joyous of all the ancient Hebrew holidays. It was originally called the Feast of the Barley.

SHACKLETON, shăk'l-tŏn, SIR **Ernest Henry,** British explorer: b. Kilkee, Ireland, 15 Feb. 1874; d. at sea, off S. Georgia Island, 5 Jan. 1922. He was educated at Dulwich College, served in the merchant marine and was a lieutenant in the Royal Navy Reserve. He was third lieutenant under R. F. Scott in the National Antarctic Expedition in 1901–04, and with Scott

reached lat. 82° 17′, the farthest point south then touched. He was secretary and treasurer of the Royal Scottish Geographical Society in 1903–06. In 1907–09 he commanded the British Antarctic Expedition, and succeeded in reaching lat. 88° 23′ S., 9 Jan. 1909, establishing a new record. He also ascended Mount Erebus, 13,120 feet high, and reached the south magnetic pole 16 Jan. 1909, determining its position as lat. 72° 25′, long. 154° E. He headed a third expedition in 1914–16, crossing Antarctica from Coat's Land to Mac Murdo Sound and making valuable geologic and scientific surveys. He was awarded the special gold medal of the Royal Geographical Society, the King's Polar medal with two bars, and gold medals from the Royal Scottish Geographical Society as well as from the geographical societies of Denmark, Belgium, France, Antwerp, Italy, America, Paris and Russia. He was knighted in 1909 and was an officer of the Legion of Honor. Author of 'Heart of the Antarctic' (1909); 'Diary of a Troopship.'

SHACKLETON, Robert, American writer: b. Wisconsin, 26 Dec. 1860. He studied law in Michigan, was admitted to the bar in Ohio, followed journalism in New York for five years, was in Philadelphia as associate editor of *The Saturday Evening Post* for two years. He is the author of 'Toomey and Others' (1900); 'Many Waters' (1902); 'The Great Adventurer' (1904); 'The Quest of the Colonial' (with Elizabeth Shackleton, 1907); 'Adventures in Home-Making' (1910); 'A Living Without a Boss' (1911); 'Unvisited Places of Old Europe' (1913); 'The Charm of the Antique (with Elizabeth Shackleton, 1915); 'Four on a Tour in England' (1915); 'Life of Russell H. Conwell' (1916); 'The Book of Boston' (1916).

SHAD, the popular name of three recognized anadronous fishes of the genus *Clupea,* viz., the Allis, or European shad; the American shad, *clupea sapidissima;* and the Twaite shad, *clupea finta.* To these should be added a fourth, recently discovered to be distinct, to the Gulf States. This genus is closely allied to the alewives (*Pamolobus*), from which it is distinguished by the very deep head, particularly the cheeks, and by having the upper jaw compressed and grooved to receive the tip of the lower. The American Atlantic shad is the largest of the herrings found in this country, the female exceeding the male and generally weighing at the spawning age three to six pounds, though larger ones are taken. On the Pacific Coast, where the shad has been introduced and established, it reaches a greater weight. The body is deep and compressed, especially on the belly, where the scales and their supporting bones form a series of serrations; the scales are large and very easily detached; the mouth toothless and the gill-rakers long and numerous. The numerous slender, pin-like bones, which are such an annoyance at the table, are chiefly several series of intermuscular bones which support the muscle segments above the ribs. There is a narrow lateral strip of dark muscle.

The northern limit of the shad's range is the Gulf of Saint Lawrence, south of which it enters all of the rivers of the Atlantic seaboard unless prevented by some obstruction. Introduced into the Sacramento River by the California and United States fish commissions in 1871–80, it has now become abundant on the Pacific Coast from Monterey Bay to Alaska. Concerning the habits of the shad during the greater part of its existence in the sea, very little is definitely known. Apparently, from the fact that they are taken frequently with mackerel and other fishes near the coasts, they do not depart very far from the shores. Their structure indicates that they swim near the surface, strain through their gill-rakers the water taken in by the mouth, and retain the minute life which it contains. This food appears, from what few stomach examinations have been made, to consist chiefly of minute crustaceans. Their movements are controlled largely by the temperature of the water and, although the annual migration from the sea to the rivers is solely for the purpose of reproduction, it takes place when the temperature of the water lies between 56° and 66°, and is hastened or retarded accordingly by warm or cold seasons. The movement of the schools begins in November and ends in March in the Saint John's River and progresses regularly from south, northward, as the season advances, the chief runs in the Potomac occurring in April, in the Delaware in April and May and in the Kennebec in May and June. During the earlier weeks of the migration males predominate, during the later, females. The eggs may be deposited anywhere above brackish water, at the mouths of creeks or high up the rivers. No nest is formed or other care given the eggs; the spawn and milt are simply ejected in intermingling streams as the male and female fish swim side by side about the time of sunset. The fertilized eggs are about one-eighth of an inch in diameter with a water space beneath the egg membrane and, being heavy, sink to the bottom. From 30,000 to 100,000 eggs are taken artificially from each female, but the natural yield is much greater. After spawning, the fish which are lean and starved begin to feed and move sea-ward. The young shad remain in the rivers much longer and do not finally enter the bays and coastal waters until the temperature of the river water approaches 40° when, in November, they are about three inches long. They remain in the sea for three or four years until mature, though a few immature ones often enter the rivers in the spring with herrings or shad, and they have been found on several occasions in shallow bays along the coast. Besides man, the shad has many enemies, and the destruction of the eggs and young by predaceous fishes, and especially by eels, is enormous. Because of this fact and the added one that shad can be caught only before and during the spawning season, and for various other reasons, the shad fisheries had greatly declined and in some places had even been abandoned during the seventies.

To remedy this the United States Fish Commission took up the problem of the artificial propagation of shad and succeeded so well that the fisheries have not only been saved, but greatly extended and at the present time are dependent on this means of maintaining the abundance of this fish. The chief advantage of artificial over natural propagation lies in the much larger percentage of eggs fertilized and hatched. In its perfect state the method is very simple but exact. The spawn-takers enter the boats as the nets are drawn and select and strip with great precision the ripe males and females, the milt being squirted over a layer of eggs in the bottom of a moist pan, after which a small quantity of water is added and the whole gently agitated. The surplus milt is then washed away and eggs carefully washed and cleaned. As the eggs are heavier than the water they are now hatched in a closed McDonald or siphon jar, to which a stream of fresh water is admitted through a glass tube running to the bottom, and the overflow drawn off at the top, thus constantly moving the eggs. They begin to hatch in about a week, though the time varies with the temperature, and as the young fry and nearly hatched eggs rise to the surface they are drawn off automatically at the outlet into larger vessels. With careful attention to details the fry are distributed to the various creeks and rivers a few days after hatching, in some cases the special cars devised for carrying young fish being employed for their transportation. They may, however, be readily reared in ponds, and many have been thus kept for months or even a year before being liberated. The shad-hatching work at one time reached enormous proportions. In 1900, for example, the United States Fish Commission hatched and distributed 241,056,000 fry; but in the fiscal year 1916–17 the distribution fell to 77,946,000 fry.

The great estimation in which the shad is held as a food-fish led to the development of this fishery so that it is exceeded in value only by that of the cod and salmon. The fisheries attained their greatest extent in Delaware Bay and river, Chesapeake Bay and tributaries and the North Carolina sounds. By 1916 the supply had become imperiled by unrestricted fishing and by obstructions and pollutions. In the Hudson, formerly one of the leading shad streams, the catch decreased from 588,898 in number in 1896 to 9,287 in 1916; in the Chesapeake region, from over 7,000,000 pounds in 1890 and 3,252,000 in 1909, to 1,454,535 in 1915; in Virginia, from 11,500,000 pounds in 1897 to 4,714,124 in 1915. In 1915 these fisheries were operated on a capital of $1,528,824, and the value of their products was $1,155,670. With the exception of a few pickled and salted the entire catch of shad is consumed fresh. In the sounds, bays and estuaries many are taken in pound nets and weirs, but in the rivers above their mouths gill nets and seines are the chief means of capture. Some of the great seines in use on the Potomac and Delaware rivers are more than a mile in length and are hauled by means of donkey engines.

Two species of shad are found in Europe, the common or allis shad (*Alosa vulgaris*) and the twaite shad (*A. finta*). The common shad inhabits the sea near the mouths of large rivers, and in the spring ascends them for the purpose of depositing its spawn in the shallow water about their sources. The young fry remain for a season in the waters which gave them birth, but on the approach of cold weather descend the rivers and take refuge in the ocean. The old ones likewise return, and at this time are emaciated and unfit for food. Its color is a dark blue above, with brown and greenish lustres, the under parts being white. The twaite shad is about a half less than the common species, and weighs on an average about two pounds.

Bibliography.— Goode, 'The Fisheries Industries of the United States' (Washington 1884–87); Stevenson, 'The Shad Fisheries of the Atlantic Coast,' Report United States Fish Commission (Washington 1899); Brice, 'A Manual of Fish Culture' (Washington 1897); Cunningham, 'Marketable Marine Fishes' (New York 1896); and the Annual Reports of the United States Bureau of Fisheries. See CLUPEIDÆ; HERRING.

SHAD-BUSH. See AMELANCHIER.

SHAD-FLY, a May-fly (q.v.).

SHAD-WAITER. See WHITEFISHES.

SHADDOCK, a small tree (*Citrus decumana*) of the order *Rutaceæ.* It is a native of the Malay Archipelago, whence it has been introduced into India, the West Indies, Florida, California and other warm climates for its fruits. It is a small tree about 25 feet tall, with large ovate leaves, large white flowers and light yellow or pink fruits, with sweet or acid pale yellow or reddish pulp, arranged in sections like those of the orange. In some horticultural varieties the fruits are more than six inches in diameter and weigh more than 10 pounds. The true shaddocks are pear-shaped and are seldom found in the northern markets, since the round fruited kinds or "pomelos" are in America considered more valuable for shipping. The name "grape-fruit" is often applied to the shaddock because it is produced in clusters somewhat resembling grapes. Other popular names are forbidden fruit, fruit of paradise, pumelo, pompelos and variations of spelling. The tree is somewhat larger than its relative, the orange, and is planted about 30 feet apart. It is found to be most satisfactory when budded upon its own stock, or that of the sour or sweet orange, the first being preferred by many growers. It is considered more tender than the orange and in the United States is grown only in the lower part of the Florida Peninsula and warmer California. The cultivation, fertilization and management are practically the same with the above exceptions to those of the orange and lemon (qq.v.).

SHADOOF, an ancient Egyptian contrivance for raising water. It is extensively in use in the East for drawing water for irrigation purposes, and its prototype is found in use in the South in the United States, where it is employed to draw water from the open "surface" wells. The machine consists of a cross-bar on two uprights; suspended on this horizontal bar is a long rod or branch of a tree, so fixed as to work as on a fulcrum, the long end or lever pointing upward and over the water, usually a river or stream, and the short end behind the bar and nearest the ground. On the short end is affixed a weight of rock or dried mud, to act as a counterpoise to the long end. From the end of the long portion a bucket is suspended. When not in use the shadoof naturally rests with the short weighted end next to the ground and the long end, with dependent bucket, in the air. When it is desired to draw water the bucket is pulled down (by a rope attached to the long end) and is dipped under the water; on account of the weight at

the other end it is now easy to tip the shadoof, again bringing the bucket into the air where it can be poured into any object on the bank desired — often a hole, from which a runnel conveys the water to irrigation ditches. Shadoofs are often made two or more, side by side, or a succession of them along the bank to be used at different stages of the water.

SHADOW, the darkness caused by the interposition of an opaque substance between a luminous point or body and the place upon which the shadow is thrown. When the substance that casts the shadow is in open space, the form of the shadow is that of a section of the substance made at right angles to the direction of the ray of light. When the body casting the shadow is larger than that which emits the light the shadow goes on constantly increasing in diameter the further it goes; when it is of the same size with the latter, the shadow is unlimited in length, but always remains of the same diameter; and when it is smaller the shadow gradually diminishes to a point, where it terminates. The intensity of the shadow depends upon the degree of transparency, translucency or opaqueness possessed by the substance interposed between the point of light and the place on which a shadow is cast.

SHADOW PLAY, or **SHADOW PANTOMIME,** a theatrical performance acted by puppets or persons, whose shadows are thrown upon a screen by means of a light placed back of the performers. The idea is of great antiquity and is thought to have originated in China. It has long been a favored entertainment in Japan, the Malay Archipelago, throughout southern and western Asia, Egypt and eastern Europe. It was introduced in France in the 18th century, and like the puppet shows and pantomimes, became popular as an entertainment for children. It is revived from time to time, usually in vaudeville or cabaret acts.

SHADWELL, Charles Lancelot, English lawyer and author: b. London, England, 16 Dec. 1840. He was educated at Christ Church, Oxford, was called to the bar of Lincoln's Inn in 1872. From 1905 to 1914 he was provost of Oriel College and is a late Fellow of Winchester College, and has published 'The Laudian Statutes' (1888); 'History of Oriel College' (1891); 'The Earthly Paradise' (1899); 'Registrum Orielense' (2 vols., 1893–1902); 'The Purgatory of Dante Translated in English Verse' (1892); 'University and College Estates Acts' (1898). He edited Pater's 'Greek Studies' (1895); 'Miscellaneous Studies' (1895); and 'Gaston Latour' (1896).

SHADWELL, Thomas, English dramatist and poet laureate: b. Stanton Hall, Norfolk, about 1640; d. London, 19 Nov. 1692. He was educated at Cambridge and subsequently studied law. His comedy, 'The Sullen Lovers' (1668), was successful and he thereafter devoted himself to literature. He wrote 17 plays, the most of them modeled on the style of Ben Jonson, which caricatured with genuine humor, though somewhat coarsely, various eccentricities in the manners of the day. After the Revolution he became, in 1688, poet laureate and royal historiographer, succeeding Dryden and thereby incurring the enmity of that poet, who made him the hero of his clever satire, 'MacFlecknoe.' His death was supposed to be due to an overdose of opium. His poetry was of little merit, but his dramatic pieces, though of only temporary reputation, were much lauded in their day. They include 'The Virtuoso' (1676); 'Lancashire Witches' (1682); 'Volunteers, or the Stock-jobbers' (1693), etc. His collected 'Works' were published in four volumes (1720). Consult Gray, W. F., 'Poets Laureate of England: Their History and their Odes' (London 1914), and Ward, A. W., 'History of English Dramatic Literature (3 vols., New York 1899).

SHAFFNER, Taliaferro Preston, American inventor: b. Smithfield, Va., 1818; d. Troy, N. Y., 11 Dec. 1881. He studied law and was admitted to the bar, but practised little, his attention being largely absorbed by inventions. In the early days of the telegraph he was an associate of Samuel F. B. Morse. He built the line from Louisville, Ky., to New Orleans and that from Saint Louis to Jefferson City in 1851, and held office in various telegraph companies. He projected a North Atlantic cable that should touch Labrador, Greenland and Iceland, and secured a number of patents for the use of high explosives in blasting. During the Dano-Prussian War of 1861 he was in the service of Denmark. He published the 'Telegraph Companion: devoted to the Science and Art of the Morse American Telegraph' (1855); 'The Telegraph Manual' (1859); 'The Secession War in America' (1862); 'History of America' (1863); 'Odd Fellowship' (1875).

SHAFROTH, shăf'rŏth, **John Franklin,** American lawyer, governor and senator: b. Fayette, Mo., 9 June 1854; d. Denver, Colo., 20 Feb. 1922. He was graduated at the University of Michigan in 1875 and was admitted to the bar in 1876. He engaged in practice in Fayette until 1879, then removed to Denver, Colo., where he practised. He served in Congress in 1895–1905, was governor of Colorado in 1909–1913, and in 1913–19 was United States senator.

SHAFTER, shăf'tẽr, **William Rufus,** American military officer: b. Galesburg, Mich., 16 Oct. 1835; d. near Bakersfield, Cal., 12 Nov. 1906. At first a farmer, on the outbreak of the Civil War he entered the Seventh Michigan Infantry. He participated in the battles of Fair Oaks, Savage Station, Glendale and Malvern Hill; was appointed major 5 Sept. 1862; was taken prisoner at Thompson's Station, Tenn., in March 1863 and exchanged in May of the same year; was made lieutenant-colonel 5 June 1863 and became colonel of the 17th United States colored troops 19 April 1864; brevet brigadier-general of volunteers for gallant and meritorious services during the war; and was mustered out of the volunteer service 2 Nov. 1865. He entered the regular army and became lieutenant-colonel of the 41st Infantry 26 Jan. 1867; assigned to the 24th Infantry 14 April 1869; colonel of First Infantry 4 March 1879; and brigadier-general 3 May 1897. On the breaking out of the Spanish-American War he was given command of the army mobilized for the invasion of Cuba; his first decisive move was the landing of 16,000 men at Daiquiri, Cuba, on 21 June 1898, in about 12 hours without an accident. He conducted the military operations resulting in the surrender of Santiago de Cuba. After the war he commanded the department of California and Columbia in 1899–1901, and was retired 3 June 1901. Consult the biography by Charles A. Weissert (1916).

SHAFTESBURY, shăfts'bŭ-rĭ, **Anthony Ashley Cooper,** 1st EARL OF, English statesman: b. Wimborne Saint Giles, Dorsetshire, 22 July 1621; d. Amsterdam, 21 Jan. 1683. He entered Exeter College, Oxford, whence he removed to Lincoln's Inn, with a view to the study of law; but was chosen representative for Tewkesbury in 1640. At the commencement of the civil war he sided with the king's party, though he appeared to deem mutual concession necessary. Finding himself in consequence of this opinion distrusted by the court he went over to the Parliament, from which he received the command of the parliamentary forces in Dorsetshire. When Cromwell turned out the Long Parliament, Sir Anthony was one of the members of the convention which succeeded. He was, nevertheless, a subscriber to the protestation which charged the Protector with arbitrary government, though this fact did not prevent him from becoming one of his privy council. After the deposition of Richard Cromwell he was privately engaged in a plan for the restoration of Charles II, which he subsequently aided with all his influence. He was one of the 12 members of the convention of 1660 who carried the invitation to the king, and was soon after made a privy councilor and a commissioner for the trial of the regicides. In 1661 he was raised to the peerage by the title of Baron Ashley, and appointed chancellor of the exchequer and a lord of the treasury. Yet he gave his strenuous opposition to two of the leading measures favored by the Crown, the Corporation Act in 1661 and the Act of Uniformity in 1662. Afterward his conduct changed and he was one of the members of the obnoxious Cabal (q.v.). He supported the Dutch war and issued illegal writs for the election of members of Parliament during a recess, and in 1673 supported the Test Act. In 1672 he was created Earl of Shaftesbury and Lord High Chancellor. His conduct on the bench was able and impartial. He had not, however, been a whole year in office when the seals were taken from him, probably through the influence of the Duke of York; and from that moment he became one of the most powerful leaders of the opposition. He made use of the Popish plot to force out the Earl of Danby's administration (1678) and produce the formation of a new one, in which he was himself made president of the council April 1679. Amid many violent party proceedings which followed the Habeas Corpus Act was passed. He remained in the administration only until October. In his hostility to the Duke of York, Shaftesbury is now supposed to have entered into connection with the Duke of Monmouth, with the view of supporting his claims to the Crown, a circumstance which gave rise to Dryden's satire of 'Absalom and Achitophel.' In consequence of this suspected design Shaftesbury was once more committed to the Tower and tried for high treason; but the grand jury before whom the bill of indictment was laid ignored it. Not long after this acquittal the earl withdrew to Holland, where he died. He was highly accomplished and easily the greatest politician and governor of parties in his time in England. Consult the biographies by W. D. Christie (London 1871) and H. D. Traill (ib. 1886); also Macaulay's 'History' (1848–55).

SHAFTESBURY, Anthony Ashley Cooper, 3d EARL OF, English moral philosopher: b. London, 26 Feb. 1671; d. Naples, 15 Feb. 1713. He was gransdon of the preceding. After travel in Germany, France and Italy, he became (1695) the representative in Parliament of Poole, in Dorsetshire, and distinguished himself while in Parliament by his support of measures favorable to public liberty. In 1698 he gave up his seat, and visiting Holland in the assumed character of a student of physic, he prosecuted his studies, and became intimately acquainted with Bayle, Le Clerc and other literary men. In 1709 he published an 'Essay on the Freedom of Wit and Humor,' an 'Inquiry Concerning Virtue or Merit,' and 'The Moralist, a Philosophical Rhapsody,' being an eloquent defense of the doctrine of a Deity and providence. His 'Sensus Communis,' and his 'Soliloquy, or Advice to an Author,' followed in 1710. At the time of his death he was engaged in a work on the 'Arts of Design.' His works were collected and published together, under the title of 'Characteristics of Men, Manners, Opinions, and Times' (1711; rev. ed. 1714). A new edition by Hatch began to appear in 1870, but was never finished. As a writer he is remarkable for the elegance but also for the excessive artificiality of his style. In all his works Lord Shaftesbury appears a zealous advocate for liberty, and a firm believer in the fundamental doctrines of natural religion; but, although he professed a respect for Christianity, he was doubtless sceptical in regard to revelation. (See CHARACT. ISTICS). Consult the works by Spicker (1872); von Gizycki (1876); Fowler, 'Shaftesbury and Hutcheson' (1882); also Rand, 'Unpublished Letters and Philosophical Regimen of the 3d Earl of Shaftesbury' (1900); Leslie Stephen 'Essays on Free Thinking and Plain Speaking' (new ed., New York 1905).

SHAFTESBURY, Anthony Ashley Cooper, 7th EARL OF, English philanthropist: b. London, 28 April 1801; d. Folkestone, Kent, 1 Oct. 1885. He was educated at Harrow and Oxford, and sat in the House of Commons during most of the period from 1826 to 1851, as member successively for Woodstock, Dorchester, Dorsetshire and Bath, but in the latter year succeeded to the peerage. He supported the administrations of Liverpool and Canning, and in 1828 he was appointed a commissioner of the board of control. Six years later he became a lord of the admiralty under Sir Robert Peel. From 1828, when he was appointed a member of a committee of inquiry into the treatment of lunatics, he constantly strove to improve the lunacy laws and administration; and it is largely due to his efforts that most of the worst abuses were removed. But his name must ever be chiefly associated with his noble and successful efforts to improve the condition of factory workers. About 1833 he first proposed the limitation of their working-day to 10 hours, and in spite of opposition his proposal became law in 1847. In 1842 an act was passed under

his direction for the improvement of the condition of colliery workers.

Though a Conservative, he supported the repeal of the corn-laws. For 39 years he acted as chairman of the Ragged School Union, and he was also identified with various movements for securing better house accommodation for the working classes. He was president of the Bible Society, of the Pastoral Aid Society, of the Protestant Alliance and of other religious organizations. He was very popular with the masses of the population. He was an ardent evangelical in religious matters, and opposed to rationalistic beliefs and ritualistic practices. He published a volume of 'Speeches' (1868). Consult Hodder, Edwin, 'Life and Work of the Earl of Shaftesbury' (3 vols., London 1886); Walpole, Sir Spencer, 'Studies in Biography' (New York 1907).

SHAG, a cormorant, epecially the Phalacrocorax corbo.

SHAGREEN, a kind of grained leather, of a close and solid substance, used for forming covers for cases, etc., which easily receives different colors. It is prepared in the East from the skins of wild asses, horses and camels. The most common color is sea-green (given by means of copper-filings and a solution of sal-ammoniac); but blue, red, black and other colors are also given it. Shagreen is also made of the skins of the sea-otter, seal, shark, etc. Consult Watt, A., 'Leather Manufacture' (London 1906).

SHAH, the title given by western writers to the sovereign of Persia; in his own country he is known by the compound title Padishah. It is also used in other countries of central and southern Asia, and signifies a sovereign prince or king.

SHAH ALUM (Alam, Alem) II, emperor of Delhi: b. 1728; d. 1806. He was the last of the Mogul emperors to exercise even a nominal independence and ascended the throne in 1759. For 12 years he was exiled and he finally, in the endeavor to strengthen his authority over his empire, sought British friendship and granted to them Bengal, Bahar and Oressa in exchange for the city and district of Allahabad. He put himself under the power of the Mahrattas in 1771, but in 1788 Delhi was seized by the Mohammedan rebel, Ghulam Kadir, who put out the emperor's eyes. From 1803–06, under the protection of Lord Lake, who had defeated the Mahrattas, Shah Alum enjoyed a period of comparative affluence, thus peacefully ending his long and wretched reign.

SHAH JEHAN, jē-hän, or **SHAH JAHAN,** Mogul emperor of Delhi: b. about 1592; d. 1666. He was fifth of the dynasty and in his youth was repeatedly in revolt against his father, Johangir, upon whose death in 1627 he succeeded to the throne. His reign saw the Mogul empire at the height of its wealth and glory. He destroyed the kingdom of Ahmadnagar in 1636; and while he lost Kandahar to the Persians in 1653, he waged successful war against the Deccan princes in 1655. In 1658, when ill, he was seized by his son, Aurang-Zeb, and imprisoned the remainder of his life. His reign was distinguished further for its remarkable achievements in architecture. He built the Taj Mahal at Agra as a tomb for his wife, Mumtaz Mahal; the pearl mosque at Agra; the palace and great mosque at Delhi, which city he founded; and also built the celebrated Peacock Throne, the value of which has been estimated at $30,000,000.

SHAH NAMEH, nä'mē ("Book of the Kings"). This Persian national epic is one of the masterworks in the world's literature. It is by Firdûsi, the greatest of the Persian poets, who spent 30 years of his life in composing it. It consists of some 60,000 rhymed couplets and is a fanciful chronicle of Irân, for to call it a history would be misleading. It is full of imaginative conceits, many of them wild, extravagant and without any basis of fact. However, what Firdûsi (whose real name was a long and quite different one, Firdûsi being an honorary appellation) sets out to do is to trace the varying fortunes of Persia, from its remotest and wholly legendary beginnings to his own time, almost. And this task, viewing him solely as a poet, he undoubtedly accomplished admirably. When he undertook it he was living at the court of the great Sultan Mahmoud Ghazni, about A.D. 1000. Poetically the legendary lore dispensed by the author is quite attractive and stirring, and his account of the glorious reign of King Jamsheed — the golden age of Persian tradition — is eloquent and enticing. So, too, is his story of the doings of the likewise mythical Khayanian dynasty and down to the days of Zerdusht (Zoroaster), where he first begins to touch on historical fact, to the first downfall and conquest of Persia under Alexander the Great, and to the even worse fate overtaking it when the Arabs destroyed the throne of the mighty Sassanides, and the national creed of the country, and forced Islam upon the Persians. It is of interest to note that the entrancing tale of the legendary Persian hero, Rustem, as given by Firdûsi in his poem, is in most respects a striking parallel to that of the Germanic hero, Siegfried, the Norse Sigurd. Very wide latitude must be granted the poet in unwinding his long tale, and his departures from historic truths; his anachronisms are frequently glaring. These however, have all been more than condoned by his Persian audiences, as they are owing for the most part to Firdûsi's intense nationalism. Besides, the Persian of every age has harbored a deep-rooted disdain for plain, sober fact. And looking at the Shah Nameh purely as a work of art, as a creation of the poet's fancy, this epic lay must be given a very high place in world literature. There is, to mention its chief merits, a sustained fire of diction, an untiring play of imagery and brilliant metaphor, a sweet euphony and sonorousness, a wealth of realistic detail, a daring fancy and an unflagging power of description which, take it all in all, are perhaps unrivaled in any other tongue. And these undeniable traits of Firdûsi's epos far outweigh its defects. Throughout he does not even seriously attempt to be a real historian, to apportion justly praise and blame, to tell the truth. But he is and remains from first to last a poet, who "in a golden clime was born, with golden stars above." And as the Persian loves to revel in poetic fancy, it is small wonder that the Shah Nameh has become one of his dearest treasures, all educated Persians even to-day being able to recite whole pages of the poem. As to translations, abridgments, etc., the best translation of the Shah Nameh is a complete French one, done by Jules Mohl under the title of 'Le Livre des Rois' (7 vols., Paris 1876–78); an excellent abridgment of it in English is by James Atkinson, 'Shah Nameh' (reprinted in the Chandos Series, New York 1886); there are also spirited versified selections from it in Robinson's 'Persian Poetry for English Readers' (Glasgow 1883). Consult also Browne 'A Literary History of Persia' (New York 1902–06).

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SHAHAN, shä'ăn, **Thomas Joseph,** American Roman Catholic bishop and educator: b. Manchester, N. H., 11 Sept. 1857. He was educated at the Montreal College; the American College, Rome; the Roman Seminary, and at the University of Berlin. He was ordained priest in 1882; was chancellor and secretary of the diocese of Hartford in 1883–88; became professor of church history and patrology at the Catholic University of America in 1891, and since 1909 has been rector there. He was created domestic prelate of the Pontifical Court, Rome, with rank of monsignor, in 1909, and was consecrated titular bishop of Germanicopolis 15 Nov. 1914. He is a contributor to the leading Roman Catholic magazines; edited the *Catholic University Bulletin* in 1895–1909; and was associate editor of the 'Catholic Encyclopedia' in 1905–15. Author of 'The Blessed Virgin in the Catacombs' (1892); 'The Beginnings of Christianity' (1903); 'Saint Patrick in History' (1905), etc.

SHAHAPTIAN (shä-häp'tę-an) **INDIANS,** a linguistic stock of North American Indians, the name of which is adapted from the Kootenay name of the Nez Percés, one of its principal tribes. The divisions of the stock occupied a large section of the country along the Columbia and its tributaries in what is now northeastern Oregon, southeastern Washington, and southwestern Idaho, extending from about long. 114° 30′ to 121°, and between lat. 44° and 46°. Their western boundary was the Cascade Mountains; their westernmost bands, the Klikitat on the north, the Tyigh and Warm Springs on the south, enveloping for a short distance the Chinookan territory along the Columbia which extended to the Dalles. Shahaptian tribes extended along the tributaries of the Columbia for a considerable distance, especially along Snake River, their eastern boundary being interrupted by the Bitter-root Mountains. The customs and habits of the tribes composing the stock were fairly homogeneous, the family organization was loose, and the clan system did not prevail. They subsisted chiefly on salmon and on roots and berries, and after the introduction of the horse did more or less hunting. Agriculture was not engaged in, and the villages were of temporary character owing to the necessity of frequently shifting residence in search of food. With the exception of the outbreak of the Nez Percés under Chief Joseph in 1877, due to the failure of the government to fulfil its treaty obligations with the Indians, the Shahaptain tribes have been generally peaceful. The principal tribes or bands of the stock, with their present location, are Yakima. 2,311 under Yakima agency, Washington, and perhaps 300 not under an agent; Nez Percé (Chopunnish), 1,567 under Nez Percé agency, Idaho, and 126 under Colville agency, Washington, total 1,693; Klikitat, about 165 under Yakima agency, Washington; Paloos, unknown number under same agency; Tenaino, 70 under Warm Springs agency, Oregon; Tyigh, about 430 under same agency; Umatilla, 184 under Umatilla agency, Oregon; Wallawalla, 525 under same agency; Tukspush or John Day Indians, about 60 under Warm Springs agency.

SHÁHJEHÁNPUR, shä-jē-hän'poor, India, chief town and administrative headquarters of a district, 100 miles northwest of Lucknow. Some fine mosques and the ruins of an ancient castle are its most interesting architectural features. Its chief industries are agriculture, sugar refining, and distilling, and the export trade consists of sugar, pulses and cereals. The town was founded in 1647 by the Mogul emperor, whose name it bears. In the mutiny of 1857–58 it was one of the active seats of the rebellion. Pop. 71,778.

SHÁHRASTANĪ, shä'ras-tä'nē (ABŪ'L-FATH MOHAMMED IBN 'ABD AL KARĪM AL SHARASTĀNĪ), Arabian theologian: b. Sharastan, Korasan, 1071?–1086?; d. there 1153. He studied at Jurjānīyah and Nishapur, devoting himself especially to Ash'arite theology. In 1116 he went on pilgrimage, and returning remained three years in Bagdad, reaching home in 1120. His chief work is the 'Kitāb ul Milal wan-Nihal,' a painstaking and well-arranged study of the religious sects and philosophical schools known to him. The work first discusses the five races of the world and the basis of the religion and theories of each. His account of the many Mohammedan sects is particularly full and valuable; and he deals also with Christianity, Judaism, the pre-Islamic Arabs, the Greek philosophers and with heathen beliefs. The work was published by Cureton, W., 'Book of Religious and Philosophical Sects' (London, 2 vols., 1846); and by Haarbrucker, T., (Halle, 2 vols., 1850–51).

SHAIRP, shärp, **John Campbell,** Scottish poet and miscellaneous writer: b. Houston, West Lothian, 30 July 1819; d. Ormsary, Argyllshire, 18 Sept. 1885. He was educated at Glasgow University and Balliol College, Oxford, and after a term as assistant-master at Rugby was appointed assistant professor of Latin at Saint Andrews in 1857 and professor in 1861. In 1868 he was made principal, and thereafter was generally known as "Principal" Shairp. From 1877 he also held the chair of poetry at Oxford. As a critic and expositor Shairp was markedly illuminating and careful. His works consist of 'Kilmahoe, a Highland Pastoral, and other Poems' (1864); 'Studies in Poetry and Philosophy, including essays on Wordsworth, Coleridge and Keble, which furnish some of the best of his writings (1868; 4th ed., 1886); 'Culture and Religion' (1870); 'Life and Letters of J. D. Forbes' (1873), with Tait; 'Poetic Interpretation of Nature' (1877); 'Burns' (1879); 'Aspects of Poetry' (1881). Posthumous collections are 'Sketches in History and Poetry' (1887), edited by Veitch; and

'Glen Desseray and other Poems' (1888), edited by Pelgrave. Consult Knight, W. A., 'Principal Shairp and his Friends' (London 1888); Sellars, 'Portraits of Friends' (1889); and the article by Dean Boyle in the *Guardian* for 30 Sept. 1885.

SHAKERS, the common name of the United Society of True Believers in Christ's Second Appearing. The name originated in the somewhat violent and irregular motions — leaping, shouting, etc., which were once a part of their worship, but which are so no longer, the motions of the Shakers at worship in these days being uniform and regular, and without sensational features. Although originating in England the sect is wholly American, and presents in its several communities an interesting example of thrift, industry and good morals.

The founder of the Shaker sect was Ann Lee, born at Manchester, England, in 1736. Her father was a blacksmith, and she became at an early age the wife of a blacksmith. She was converted in 1758 by the preaching of Jane Wardlaw, a member of the Society of Friends, who exhorted the people to repent of their sins, declaring that the end of all things was at hand, that Christ was about to reign, and that his second appearance would be in a woman's form. Ann Lee also preached, and was put in prison at Manchester on a charge of disturbing the public peace. When released she began preaching again, and announced that the Lord Jesus had stood before her in prison, and had become one with her in form and spirit. She called herself "Ann the Word," but her followers gave her the title of "Mother 'Ann." She was persecuted and annoyed to such a degree that she emigrated to America with seven companions, and formed the first Shaker settlement at Watervliet, near Albany, N. Y. Here she also endured imprisonment with some of her followers who refused to bear arms in the War of Independence, on the ground that it was against their principles to serve as soldiers. Ann Lee died 8 Sept. 1784, having witnessed the founding of two new Shaker communities, one at Hancock, the other on Mount Lebanon, New Lebanon, N. Y., the first Shaker meeting house being established in the year following her death, at Mount Lebanon, which is still the most flourishing of the Shaker communities. Joseph Meacham, one of Ann Lee's successors, gave to the Shakers their effective organization, which combines thorough business methods with strict adherence to the principles of their faith. There is no marriage, the two sexes occupying rooms in separate parts of houses, and when married couples join the society, they regard each other as brothers and sisters only. The men do the work of farm and garden, factory and shop, and some widely extended industries owe their origin to the inventive ability of the Shakers. The women cook and attend to the housework, every room being a model of cleanliness. They do much of the tailoring and repairing; prepare seeds and medicines for market, and make butter and cheese. Everybody is occupied, and there is no room or attraction for drones.

Alcoholic liquors are known only as a medicine, and good health is so general that there is but little need for medicine of any kind. The use of tobacco is tabooed, and the diet, while both generous and varied, does not include flesh-meat or fish. The fact that Shakers live, as a rule, to an advanced age, and enjoy excellent health, is adduced in favor of abstinence from meat. It is also noted as significant that none of the Shakers suffer from cancer.

The Shaker belief agrees in certain respects with that of the Quakers, from whom the original Shakers were an offshoot. They give due respect to the civil law, but they reject ecclesiastical supremacy and military service. Members of the sect who had previously served as soldiers have refused to accept pensions after joining the Shaker community, and it was largely, if not chiefly on evidence of this fact that President Lincoln ordered the release of Shakers who had been imprisoned for refusing to serve, when drafted for the Civil War. The sum saved to the government in the refusal to accept pensions would have more than paid for substitutes for the Shakers who had been drafted.

The Shakers believe that God is king; that the sin of Adam is atoned, and that man is free of all errors except his own; that every human being will be saved, and that the earth is heaven, now soiled and stained, but ready to be brightened by love and labor. They believe in the immediate revelations of the Holy Ghost, and they regard angels and other spirits as maintaining companionship and intercourse with those who have been purified and exalted by the gifts of grace. Shakers believe that at death they merely throw off the bodily garment, and change the form of their existence, but no more. They expect no resurrection of the body, the spirit, when it has left the mortal frame being done with it.

The Shakers are steadily diminishing in numbers. At its greatest their membership was 4,869; and it is now less than 1,000, in 17 societies, distributed over the States of New York, Massachusetts, New Hampshire, Maine, Connecticut, Ohio and Kentucky.

Bibliography.— Blinn, 'Concise History of the Shakers' (1894); Eads, H. L., 'Shaker Theology' (Albany 1879); Evans, F. W., 'Shaker's Compendium' (New York 1859); Green and Wells, 'Summary View of the Millennial Church' (Albany 1848); Hinds, W. A., 'American Communities' (Chicago 1908); Ely, R. T., 'The Labor Movement in America' (new ed., New York 1905); Nordhoff, C., 'The Communistic Societies of the United States' (ib. 1875).

SHAKESPEARE, William, English dramatic poet: b. Stratford-on-Avon, Warwickshire, in April (?) 1564; d. there, 23 April 1616. About a century ago, George Steevens, one of the most eminent Shakespearian editors and critics of that period, wrote thus: "All that we know with any degree of certainty concerning Shakespeare is — that he was born at Stratford-on-Avon, married, and had children there; went to London, where he commenced acting and wrote poems and plays; returned to Stratford, made his will, died and was buried." And Tennyson is reputed to have said: "The world should be thankful there are but five facts absolutely known to us about Shakespeare: the date of his birth, 23 April 1564; his marriage at 19 to Ann Hathaway; his connection with the Globe Theatre, and with Blackfriars; his retirement

from theatrical life, with a competency, to Stratford; and the date of his death, which took place upon the anniversary of his birth, 1616."

If this were strictly true, however, it should be understood that there is nothing exceptional in it, though certain writers who deny that Shakespeare wrote the works ascribed to him have laid much stress upon it. The biographies of the great majority of literary men of that time, especially the dramatists, are as meagre as Shakespeare's. In the latest sketch of the lives of Beaumont and Fletcher (in the 'Mermaid' series of English dramatic writers) the editor says: "Beaumont and Fletcher, though not of obscure origin, like the greater number of their fellow dramatists, yet afford no exception to the general rule in the obscurity that surrounds their lives." The volume of the same series devoted to Webster and Tourneur begins thus: "Nothing is known about the lives of John Webster and Cyril Tourneur. We are ignorant where they were born and when they died," etc. The history of Marlowe, Massinger, and other prominent dramatists of the period is much the same, as reference to their names in the present work will show.

This is also true, as already intimated, of great authors other than playwrights. Professor Hales begins his biographical sketch of Spenser ('Globe' ed. of his works) thus: "The life of Spenser is wrapt in a similar obscurity to that which hides, from us his great predecessor Chaucer, and his greater contemporary Shakespeare. . . . The birth-year of each poet is determined by inference. The circumstances in which each died are a matter of controversy. What sure information we have of the lives of each one is scanty and interrupted."

These quotations might be multiplied if space permitted. It is clear, therefore, that no theory or argument concerning the authenticity of the works of Shakespeare can be based upon the lack of information concerning the man.

Our positive knowledge of Shakespeare's personal history, however, is by no means so limited as Steevens and Tennyson represent. The investigations of the last 50 or 60 years in municipal, theatrical and other records, in the literature of the Elizabethan and succeeding periods, and in other sources of information, have brought to light a multitude of indisputable facts concerning the man and his works.

Unfortunately, the first biography of Shakespeare worthy of the name was not written until 1709, or nearly a century after his death, being prepared by Nicholas Rowe as an introduction to his edition of the poet's works. It was based mainly upon the researches of Betterton, the actor, who a few years earlier had visited Stratford for the express purpose of ascertaining what could be learned there about the personal history of the dramatist. He communicated the results of his investigations to Rowe, to whom we are indebted for the preservation of these and other fragments of information which otherwise would have been lost. Rowe appears to have exercised great caution in dealing with his materials, discriminating carefully between what he regarded as established fact and as doubtful tradition. A few errors have been detected in the minor details that he gives, but the more important particulars have been verified by later researches.

For almost a century after the appearance of Rowe's 'Life' no serious attempt was made to improve upon it. Pope, Johnson and Steevens, in the biographical sketches prefixed to their editions of Shakespeare, substantially repeated Rowe's matter. Edmund Malone was the first to attempt a biography on a more extended scale. In the introductions to the 'Variorum' editions of 1803, 1813 and 1821, he presented a large amount of new information, based on his researches in the Stratford archives, the manuscripts collected by the actor and manager, Edward Alleyn, at Dulwich, and official records and documents in London. His 'Life of Shakespeare,' as completed and published in the 'Variorum' of 1821, fills 287 octavo pages; and to this the discussion of the chronological order of the plays adds 180 pages more.

Of the many contributions to Shakespearean biography since the time of Malone, the most important have been made by Mr. Halliwell-Phillipps, who, between 1850 and his death in 1889, continued the examination of the ancient records and documents likely to throw light upon the subject, and printed the results in successive publications and finally in the monumental work in two royal octavo volumes which he modestly entitled 'Outlines of the Life of Shakespeare,' the 9th edition of which was issued in 1890. Mr. Sidney Lee's 'Life of Shakespeare' (1898) is the most noteworthy of the other biographies published in the last half-century.

Of Tennyson's "five facts" the first is a mere conjecture. William Shakespeare was baptized, as the parish record proves, on 26 April (O. S.), but the date of his birth is not known. It has been assumed that it was 23 April (3 May by the New Style calendar) because babies were often baptized three days after birth. The only other evidence bearing on the case is the inscription on the poet's monument at Stratford, which tells us that he died 23 April 1616, in the 53d year of his age. If he died on the anniversary of his birth, it might be said, according to the usage of the time, that he was in his 53d year; but the inscription *proves* nothing except that he could not have been born later than 23 April 1564.

John Shakespeare, the poet's father, was of the yeoman class, and had been a farmer in a neighboring village before he came to Stratford about 1553, and adopted the trade of a "glover," dealing also in wool and agricultural produce, with which his former occupation made him familiar. His ability and public spirit are shown by his rapid success in business, which soon enabled him to buy two houses in Stratford, and by his rising through the lower grades of office to that of high bailiff, or mayor, of the town in 1568. His wife, Mary Arden, belonged to a minor branch of an old Warwickshire family, and inherited a considerable estate from her father.

John and Mary Shakespeare had four sons and four daughters. William was the third child, but the eldest son. Of his early years nothing is known, but it is probable that at the age of seven (the earliest at which he could be admitted) he entered the Stratford Grammar

School, an ancient institution which, after being closed for some years on account of the dissolution of the local Guild, on whose revenues it was dependent, by Henry VIII in 1547, was re-established by Edward VI in 1553 as "The King's New School of Stratford-upon-Avon." The masters of the school in the poet's boyhood were university men of good scholarship. The studies were mainly Latin, with writing and arithmetic, and possibly a little Greek, which was sometimes taught in the grammar schools at that time. Ben Jonson credits Shakespeare with "small Latin and less Greek"; and we may be quite certain that the boy had no regular schooling except what he got at Stratford. It is evident from his works that he had not the learning which a few of the critics have ascribed to him. His quotations from Latin literature are such as a schoolboy might make from Virgil, Ovid and the other authors he had studied; and his allusions to classical history and mythology are mostly from the same sources, or from the familiar stock in English books of the period. The historical materials of his plays are evidently from a very limited number of English authorities, like Holinshed's 'Chronicles' and North's 'Plutarch'; and in the use of these he often makes mistakes of which an average scholar could never be guilty.

It should be understood that the notion that Shakespeare was a learned man is of comparatively modern date. In the reference to the dramatist in the literature of his day and for a century after his death (as carefully collected by the New Shakspere Society of London) there is no hint of it, while expressions of the contrary opinion are frequent. John Hales of Eton, writing before 1633, and referring to a conversation concerning Shakespeare in which Sir John Suckling, Sir William Davenant, Ben Jonson and he himself were engaged, says that, "hearing Ben frequently reproaching him [Shakespeare] with the want of learning and ignorance of the ancients," he [Hales] "told him that, if Mr. Shakespeare had not read the ancients, he had likewise not stolen anything from them (a fault the other made no conscience of), and that, if he would produce any one topic finely treated by any of them, he would undertake to find something upon the same subject at least as well written by Shakespeare." Jasper Mayne, writing in 1637, mentions Shakespeare among the dramatists, who did their work "without Latin helps." H. Ramsay, also in 1637, complimenting Ben Jonson for his knowledge of Latin and Greek, says that he

> "could command
> That which your Shakespeare could scarce understand."

Leonard Digges, in the verses prefixed to the 1640 edition of Shakespeare's 'Poems,' compliments him for his "Art without art, unparalleled as yet," and adds that he borrows nothing from Greek or Latin; yet, as he says, Shakespeare's 'Julius Cæsar' ravished the audience,

> "When some new day they would not brook a line
> Of tedious (though well labour'd) *Catiline;*"

and "'Sejanus' too was irksome"—referring to Ben Jonson's Roman plays.

The learned Fuller, in his 'Worthies' (probably written about 1642), says of Shakespeare: "He was an eminent instance of the truth of that rule, *Poeta non fit, sed nascitur;* one is not *made* but *born* a poet. Indeed his learning was very little; . . . nature itself was all the *art* which was used on him." Then follows the familiar passage about "the wit combats between him and Ben Jonson, which two I behold like a Spanish great galleon and an English man-of-war. Master Jonson (like the former) was built far higher in learning; solid but slow in his performances: Shakespeare, with the English man-of-war, lesser in bulk but lighter in sailing, could turn with all tides, tack about, and take advantage of all winds, by the quickness of his wit and invention."

Lady Margaret Cavendish, in the 'General Prologue' to her 'Plays' (1662), after praising Ben Jonson, says:

> "Yet gentle Shakespeare had a fluent wit,
> Although less learning, yet full well he writ;
> For all his plays were writ by Nature's light, etc."

Dryden, in his 'Essay on Dramatic Poesy' (1668), says of Shakespeare: "Those who accuse him to have wanted learning, give him the greater commendation; he needed not the spectacles of books to read Nature; he looked inwards and found her there."

The same great critic, in a prologue to Shakespeare's 'Julius Cæsar' in 1672, says of the author of the play:

> "So in this Cæsar which to-day you see,
> Tully ne'er spoke as he makes Antony.
> Those then that tax his learning are to blame;
> He knew the thing, but did not know the name.
> Great Jonson did that ignorance adore,
> And tho' he envied much, admired him more."

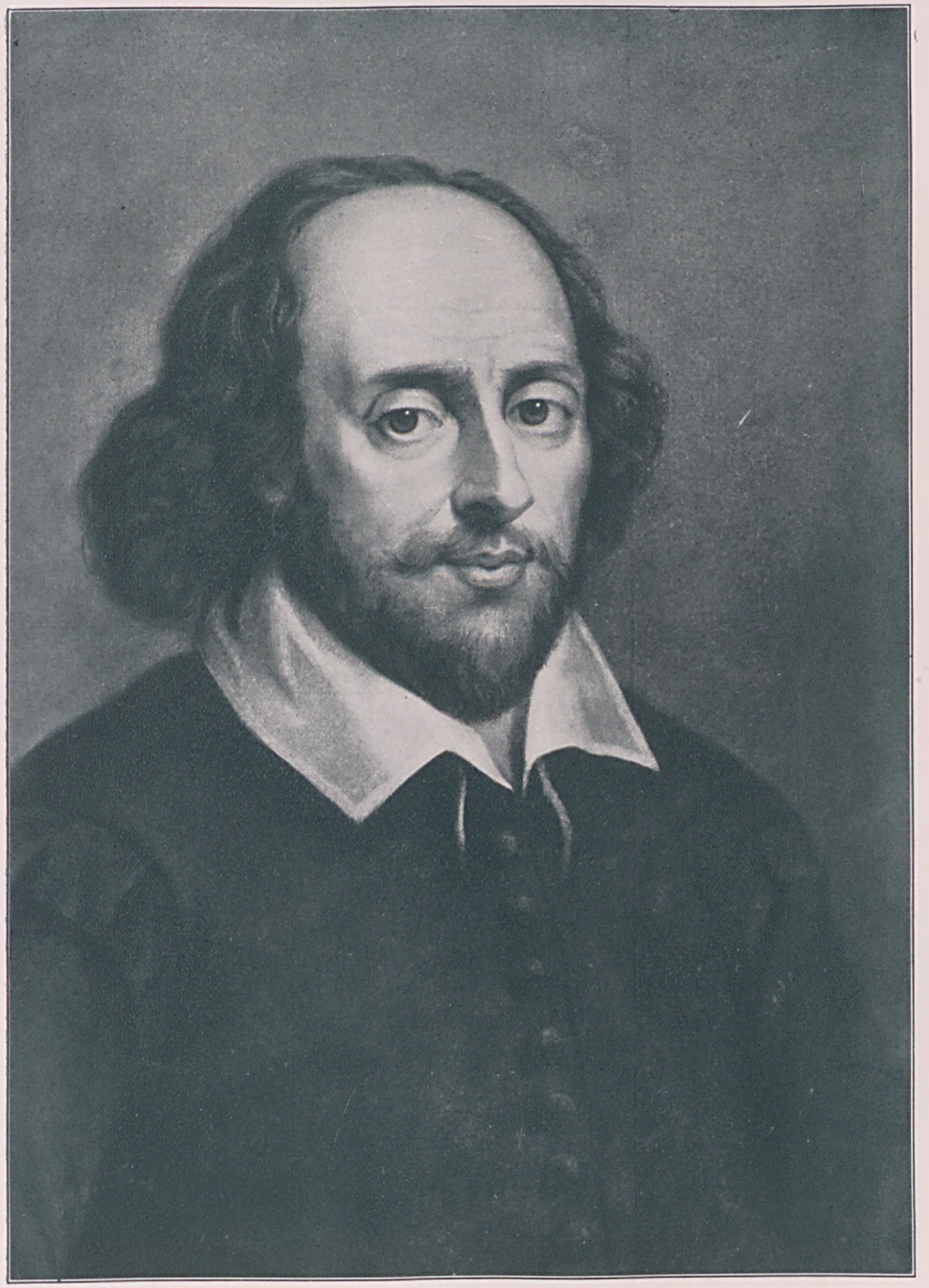
Writing again in prose, he alludes to Shakespeare as "wanting that learning and care which Jonson had."

Gerard Langbaine, in his 'Account of the English Dramatic Poets' (1691), says that Shakespeare "was as much a stranger to French as Latin," and that "'t is agreed that his learning was not extraordinary"; and yet he ranks "his plays beyond any that have ever been published in our language."

These quotations might be multiplied, but enough have been given to show what was the universal opinion of the best critical judges in the 17th century concerning Shakespeare's lack of learning. Nature, or *genius,* they all agree, more than made up for the deficiency.

The single slight hint of the opposite opinion in writers of the 17th century is in an 'Address' by Nahum Tate (noted for his bad "new-modelling" of 'Lear' and other plays of Shakespeare), printed in 1680. He says: "What I have said concerning the necessity of learning to make a complete poet may seem inconsistent with my reverence for our Shakespeare. I confess I could never get a true account of his learning, and am apt to think it more than common report allows him. But, however, it fared with our author for book-learning, it is evident that no man was better studied in men and things, the most useful knowledge for a dramatic writer." We see that Tate had failed in his endeavor to find proof of Shakespeare's learning, thus indirectly confirming the unanimous testimony of the critics of that time to the contrary.

About the middle of the 18th century, John Upton, the elder George Coleman and a few



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other critics took the ground that certain passages in the plays indicated an acquaintance with Greek, Latin and later foreign authors whose works had not been translated into English when Shakespeare wrote; but they were completely refuted by Richard Farmer, in his famous 'Essay on the Learning of Shakepeare,' published in 1766. Dr. Warton refers to it as "a work by which an end is put forever to the dispute concerning the learning of Shakespeare. It did settle the question until the Baconian heretics revived it and made it the corner-stone of their theory.

Shakespeare's real education, as Tate intimates, was in the study of "men and things." His early years were spent in the heart of rural England, where he became familiar with woodland scenery and life, and imbibed the love of nature which is one of his most marked characteristics. There also he got the minute knowledge of the practical side of country life which has furnished material for many volumes on the plant-lore and garden-craft illustrated in his works, and on his familiarity with hawking, hunting, fishing and the habits of English birds and animals. Warwickshire was, moreover, rich in historical associations. The castles of Kenilworth and Warwick had been centres of political and military interest during the civil wars of the 13th and 15th centuries. Queen Elizabeth's famous visit to the Earl of Leicester at Kenilworth occurred in 1575, when Shakespeare was 11, and his father, who was then a magistrate at Stratford, may have taken the boy with him to see something of the pageant which attracted throngs of visitors from all the region roundabout. The legendary and romantic lore of the district, in which the redoubtable Guy of Warwick was the chief hero, must also have stirred and stimulated the poet's youthful imagination. Coventry, in the same county, was renowned for its old religious plays, which were not entirely suppressed until 1580; and traveling companies of players visited Stratford when he was five years old and frequently during his boyhood and youth. He must have witnessed these local performances, if not some of those at Coventry, and we can imagine how they developed his taste and love for the drama. The training in the grammar school was an insignificant part of his early education compared with what he got outside of its ancient walls.

It is not improbable that he left school when he was 13. About that time his father's fortunes were declining, probably on account of the general depression in trade, and he may have needed the boy's help in his business or have found other work for him. An improbable tradition says that he was bound apprentice to a butcher, but later ran away to London. According to another tradition, he was an attorney's clerk for a time; and the knowledge of law shown in his works has led Lord Campbell and other professional critics to give credit to this story. Judge Allen, however, in his 'Notes on the Bacon-Shakespeare Question' (Boston 1900), has shown that similar familiarity with legal technicalities appears in the works of contemporary dramatists, and that Shakespeare often makes mistakes in these matters which no lawyer or student of law could be guilty of.

Shakespeare's marriage, when he was between 18 and 19, is the next fact in his history of which we have positive proof. The bride, Ann Hathaway, was about eight years older. She was the daughter of a farmer in the neighboring village of Shottery, and the house in which her father, Richard Hathaway, is supposed to have lived, was bought in 1892, as Shakespeare's birthplace in Stratford had been bought in 1848, for preservation in memory of the poet. The marriage probably took place early in December 1582, a bond, authorizing it "with once asking of the bans" being still extant in the Episcopal archives of Worcester, the diocese in which the parties resided. The bond bears the date of 28 Nov. 1582, but no record of the marriage, which was doubtless in one of the neighboring villages, has survived the risks to which English parish registers were often exposed. A daughter was born to the pair the next May, her baptism with the name Susanna being recorded at Stratford on Sunday, 26 May 1583. Twin children, Hamnet and Judith, were baptized, 2 Feb. 1585, about two months before their father was 21.

The marriage had evidently been a hurried one, urged on by the relatives of the bride, but apparently not favored by those of the bridegroom, who could not honorably avoid it, and seem not to have been inclined to do so. Some biographers believe that the couple had been formally betrothed some months before the marriage, according to the custom of the time, and this is by no means improbable. The betrothal was then a legal ceremony, consisting in the interchange of rings, kissing and joining hands, in the presence of witnesses and often before a priest. Violation of the contract was punished by the ecclesiastical law with excommunication; and the betrothal was a legal bar to marriage with another person, except by the joint consent of the parties. In Shakespeare's time, at least among the common people, it was often regarded as conferring the rights and privileges of the more formal union that was to follow; but later in the century the Church authorities condemned this license. There may have been such a pre-contract, or betrothal, in the case of William and Ann. In the absence of any positive testimony to the contrary, it is no more than fair to allow them the benefit of the doubt.

It is an interesting fact that this ancient betrothal is introduced by Shakespeare in at least seven of his plays,— 'The Two Gentlemen of Verona,' 'The Taming of the Shrew,' 'Twelfth Night,' 'The Winter's Tale' (twice), 'Much Ado,' 'Measure for Measure,' and 'King John.' In 'Twelfth Night,' Olivia, who has been betrothed to Sebastian, supposing him to be the disguised Viola, addresses the latter as "husband," and justifies herself by appealing to the priest before whom the ceremony had been performed, with the understanding that it was to be kept secret until the marriage should take place. Similarly, Robert Arden, the poet's maternal grandfather, in a legal document, calls his daughter Agnes the wife (*uxor*) of the man to whom she was married three months later.

Of Shakespeare's life after his marriage until he went to London nothing further is known. How he managed to support his family we cannot guess. He could have little or no assistance from his father, who, in his re-

duced circumstances, could barely take care of his own household in which there were now four younger children. William soon decided to leave his wife and babes in Stratford — or perhaps at Shottery with Mrs. Hathaway, then a widow with a comfortable house and income — and to try his fortune in London. The precise date of this move is uncertain, but it was probably in the latter part of 1585 or early in 1586. He came of age in 1585, and that fact may have influenced him in making the venture. Tradition says that about this time he was caught in deer-stealing on Sir Thomas Lucy's estate, and that his departure for the metropolis was prompted or hastened by the prosecution that followed the offense. That the poaching tradition was founded on fact is quite certain from the evidence in '2 Henry IV' and the 'Merry Wives of Windsor' that Lucy is caricatured as Justice Shallow. The "dozen white luces" in the latter play were apparently suggested by the three luces, or pikes, in the arms of the Lucy family; and the allusions to poaching in the context are equally significant.

What Shakespeare found to do on his arrival in London we do not know. The tradition that at first he held horses at the door of the theatre, said to have originated with Sir William Davenant, is not improbable, as it was then common for gentlemen to go to the theatre on horseback. We know that somehow the young man soon got into one of the two playhouses then established in London — the Theatre and the Curtain — where he doubtless had to begin in some humble capacity. According to tradition, he was first employed as a "prompter's attendant, whose duty it was to give the performers notice to be ready to enter" on the stage. Soon, however, his abilities must have been recognized, and he began his career of an actor in small parts, gradually working his way up to a better position in the company.

If he went to London in 1585, seven years elapsed before we have any positive information about him, or even any tradition worth mentioning except that of his holding horses at the door of the theatre and his first employment inside as "call-boy." At length, in 1592, we hear about him through a contemporary playwright, Robert Greene, who died in the autumn of that year, leaving a little book, 'Greens Groatsworth of Wit, bought with a Million of Repentance,' to be published after his decease. After referring to some of his fellow dramatists, Greene says of the actors: "Yes, trust them not, for there is an upstart crow, beautified with our feathers, that, with his *Tygers heart wrapt in a Players hide,* supposes he is as well able to bombast out a blanke verse as the best of you; and being an absolute Johannes Factotum, is in his owne conceit the only Shake-scene in a countrie." That the epithet of "Shake-scene" refers to Shakespeare cannot be doubted, and the passage implies that he was both actor and author, and perhaps plagiarist also. "Beautified with our feathers," as some believe, may refer to plagiarism, but it may simply mean gaining credit by acting what others have written. The italicized quotation is a parody of "O tiger's heart wrapt in a woman's hide" in '3 Henry VI,' an old play in which Greene is supposed to have had a share and which was revised by Shakespeare. In December 1592, Henry Chettle, who had published Greene's pamphlet for him, brought out his own 'Kind Harts Dreame' in which he apologizes for Greene's sneer at Shakespeare and adds: "Myselfe have seene his demeanor no less civill than he exelent in the qualitie (of actor) he professes; besides, divers of worship (people of rank) have reported his uprightness of dealing, which argues his honesty, and his facetious (felicitous) grace in writing, that approves his art." It is clear from Greene's envy and Chettle's eulogy that, in 1592, Shakespeare had already won credit, not only by his acting, but also by revising old plays for reproduction on the stage.

Little is known of the poet's personal history from this time until 1600. In 1596 his son Hamnet died, and was buried (11 August) at Stratford. Early in 1597 he bought New Place, a mansion with an acre of land in the best part of Stratford, and later added other lands to the estate. In 1596 John Shakespeare, doubtless by his son's advice, made application to the College of Heralds for a coat-of-arms; but the negotiations not being concluded at that time, they were renewed in 1599, when the petition was granted.

John had asked that he and his son might be allowed to quarter on the coat the arms of the Ardens of Wilmecote, his wife's family; but the heralds substituted the arms of the Ardens of Alvanley in Cheshire, apparently because those belonged to a younger branch of the family, from which Mary Arden was descended.

Shakespeare repaired New Place, which was in a dilapidated condition when he bought it. We find evidence also that he assisted in restoring the fortunes of his father and attempted to regain certain real estate belonging to his mother which had been forfeited through complications due to a mortgage.

The earliest definite notice of Shakespeare's appearance on the stage is of his having been a player in two comedies acted before Elizabeth at Greenwich Palace in December 1594. According to the official records "William Kempe, William Shakespeare and Richard Burbage" then received £13 6*s.* 8*d.* as payment, with £6 13*s.* 4*d.* in addition "by waye of her Majesties rewarde" — that is, as a perquisite.

Other performances before Elizabeth were in 1596, twice during the Christmas holidays, at Whitehall; at Richmond Palace on Twelfth Night and Shrove Tuesday, 1600; and at Whitehall, 26 December the same year. At Christmas time, 1601–02, the company played four times at Whitehall; and at Richmond, 2 Feb. 1603 — the last occasion on which they could have appeared before Elizabeth, as she died 24 March 1603.

Shakespeare's income from acting was much greater than from authorship. From the former source before 1599 it was probably £100 a year, to which the perquisites from performances at court might add £15 or more. During the same period the prices for a play ranged from £6 to £15. His receipts from revising and writing plays up to 1599 probably did not exceed £20 a year, making his entire income about £135, equal to from seven to 10 times as much in modern money. From the quarto editions of his plays, all of which were piratical, he received nothing; but from the editions of his

poems — the only works printed under his own control — he may have got something, but we have no means of estimating the amount.

When the Burbages built the Globe Theatre in 1599, they leased shares in it for 25 years to "those deserving men, Shakespeare, Hemings, Condell, Phillips and others," all of whom were players in Shakespeare's company. There were 16 shares in all, of which Shakespeare probably had two. The annual receipts of the theatre are supposed to have been about £8,000. The yearly income of a share in 1635 is known to have been more than £200. In 1600–10 it may not have been so large, but Shakespeare must have received from the theatre, as an actor and a shareholder, at least £500 a year. From 1599 the prices of plays averaged £20 or more and performances at court were more frequent and doubtless better paid.

In 1602 Shakespeare bought 107 acres of land near Stratford for £320, and the same year he bought a cottage and garden near New Place. These investments, and his dealings in agricultural produce of which we have documentary evidence, were additional sources of income.

According to Rowe, the poet once received a gift of £1,000 from his generous patron, the Earl of Southampton. There can be little doubt that the amount is exaggerated, but the Earl, who is known to have been so liberal to others, can hardly have omitted to make some substantial acknowledgement of the tribute paid him in the dedications of 'Venus and Adonis' and 'Lucrece.'

In May 1602, almost immediately after he came to the throne, King James granted a license to Shakespeare and his company to play in London and the provinces. They performed not infrequently afterward at court, as the records show; and on 15 March 1604, when James made his formal passage from the Tower to Westminster, Shakespeare and the eight other actors to whom the royal license had been granted in 1603, marched in the royal train, and each was presented with four and a half yards of scarlet cloth, the usual dress-allowance of actors belonging to the royal household. We have little positive information of the parts played by Shakespeare himself. It is reported that he took that of Adam in 'As You Like It,' and, according to Rowe, he acted "the Ghost in his own 'Hamlet.'" John Davies of Hereford (1610) says that he "played some kingly parts in sport." His name heads the list of those who took part in the first performance of Ben Jonson's 'Every Man in His Humour,' in 1598. In the list of "the principall actors in all these playes" prefixed to the Folio of 1623, his name is also placed first, but perhaps only because he was the author of the plays. There is no evidence that he ever gained high rank as an actor.

In July 1605 Shakespeare paid £440 for the unexpired term (31 years) of the moiety of a lease of the tithes of Stratford, Old Stratford, Bishopton and Welcombe. It appears to have been a good investment, for his son-in-law, Dr. John Hall, in August 1624, disposed of his interest in the remainder of the lease for £400 or only £40 less than it cost Shakespeare 19 years before. The lease had now only 12 years to run, but the officers of the Stratford Corporation who bought it appear to have regarded it as a judicious investment at £400.

On 5 June 1607 the poet's elder daughter Susanna, then 24 years of age, was married to Dr. John Hall, a physician who had a large practice among the good people of Stratford and the adjacent country. He was several times called to attend the Earl and Countess of Northampton, at Ludlow Castle, more than 40 miles off. His medical case-book, written in Latin, was translated and published in London (1657) after his death, and was reprinted in 1679 and 1683. Though an earnest Puritan, he was none the less popular with those who were bitterly opposed to the sect.

Shakespeare's brother Edmund died in London, in December 1607, and was buried in Saint Saviour's Church, Southwark. He is described in the parish register as "a player," and had probably come to London and entered the Globe Theatre through his brother's influence, but no notice of him as an actor has been discovered.

Elizabeth, the only child of the Halls, was baptized 21 Feb. 1608. The poet thus became a grandfather about two months before he was 44. She was married in 1626 to Thomas Nash, a citizen of Stratford, who died in 1647. Two years later she married Sir John Barnard of Abington Manor, near Northampton. She had no children by either husband. The last of the poet's lineal descendants, she was buried at Abington, 17 Feb. 1669, but no monument marks her grave. In September 1608, Shakespeare's mother died, her burial being recorded on the 9th of the month. Her husband, John Shakespeare, had died seven years earlier, the record of his burial being dated 8 Sept. 1601. He left no will and his son William inherited the Henley Street birthplace. Shakespeare's brother Gilbert (baptized 16 Oct. 1566) was buried 3 Feb. 1612, the record, by a clerical error, calling him "adolescens," though he was 45 years old. In February 1613, Richard, his last surviving brother (baptized 11 March 1574), also died. Joan (baptized 11 April 1569) was the only child of John and Mary Shakespeare now remaining. She married William Hart, who died in April 1616, his burial taking place on the 17th, eight days before that of the poet. Joan outlived her husband and brother 30 years.

In 1610 Shakespeare bought 20 acres of pasture land, adding them to the 107 acres acquired in 1602; and in March 1613 he made what appears to have been his last investment in real estate by the purchase of a house in London, near the Blackfriars Theatre. He paid £140 for it, and soon leased it to one John Robinson, who had been one of the opponents to the establishment of the theatre.

It was probably as early as 1611 that Shakespeare returned to Stratford and took up his residence at New Place. In that year his name appears on a list of Stratford citizens who were raising money to promote a Parliament bill "for the better repair of highways." In the spring of 1614 a Puritan preacher, invited to the town by the corporation, was hospitably entertained at New Place, perhaps through the influence of Dr. Hall, who may have been living with his father-in-law at the time. In the town records we read: "For one quart of sack and

one quart of claret wine given to a preacher at the New Place, xx. *d.*»

In the autumn of 1614 an attempt was made by William Combe, the squire of Welcombe, to enclose a considerable area of the common fields near the town. The project was opposed by the corporation as detrimental to the agricultural interests of the town and tending to diminish the tithes. Shakespeare, as we have seen, was interested in the tithes, but it would appear that he was finally led to favor the scheme by Combe, who guaranteed that he should suffer no pecuniary loss. There is no evidence, however, that he took any active part in promoting the enclosures, which were ultimately thwarted by legal injunction in March 1615.

In February 1616, Judith, the poet's younger daughter, was married to Thomas Quiney, who was nearly four years her junior. He was then in business as a vintner, and patronized by the corporation. In 1617 he was elected a burgess, and from 1621 to 1623 held the office of chamberlain. Later his business was less prosperous, and in 1652 he removed to London, where he died a few years afterward. He had three sons, two of whom died in infancy and the third at the age of 20. Judith Quiney lived to be 76, surviving all her family except her aunt, Joan Hart, and her niece, Elizabeth Barnard.

Shakespeare's health seems to have been failing at the time of Judith's marriage. He had made his will in the latter part of January 1616, as erasures in the document indicate; but for some reason it was not engrossed and signed at that time. In April the condition of the poet seems to have become suddenly worse, and the rough draft of the will, after a few alterations and interlineations, was signed without waiting for a clean transcript of it.

There is no mention of his wife in the will except the interlined bequest of the «second best bed with the furniture»; but she was amply provided for by her rights of dower, and such omission in a case of the kind is not uncommon in wills of the time. The gift of the bed, like many similar bequests in these old wills, was doubtless prompted by love and tender associations, not the insult of a dying man to the mother of his children. The misinterpretation of this clause in the will is absolutely the sole ground for the supposition that the poet was unhappy in his conjugal relations, while there is the strongest circumstantial evidence to the contrary. We have seen that more than 20 years earlier in London he was planning for his return to a residence in his native town. In 1597 he was able to buy the best house in Stratford, and he gradually developed and improved the estate, making it an ideal home for his declining years — but not, we may be certain, to be shared with a wife from whom he was estranged. His widow survived him almost seven years (her burial was on 8 Feb. 1623), and tradition says that she earnestly desired to be laid in the same grave with her husband.

The funeral of «Will Shakespeare, gent.,» as the parish register informs us, occurred 25 April 1616. His grave is in the chancel of the parish church, the legal place for the interment of the owners of the tithes. It is covered with a stone bearing the inscription:

> "Good frend, for Jesus sake forbeare
> To digg the dust encloased heare;
> Bleste be the man that spares thes stones,
> And curst be he that moves my bones."

It was not until about 70 years after his death that these lines were ascribed to Shakespeare. Neither Dugdale, in 1656, nor Rowe, in 1709, when referring to the tomb, attribute them to him. If he desired that something to the same effect should be put upon the stone, it was doubtless from fear that his bones might some day be removed to the ancient charnel house that then adjoined the church but was afterward demolished.

The monument to the poet on the chancel wall was erected before 1623. The life-sized bust is supposed to have been copied from a posthumous cast of his face. It is poor as a work of art, but it must have been accepted by his surviving relatives as a tolerably good portrait. It bears a general resemblance to the only other portrait the authenticity of which is established — the engraving in the Folio of 1623, the execution of which is equally bad. A painted portrait in the Shakespeare Memorial Gallery at Stratford is believed by many to be the original of that engraving, but others think it was copied from the engraving. The so-called Ely House portrait, according to some critics, was the basis of the engraving. There are many other alleged portraits, but their history is more or less doubtful.

The order in which Shakespeare's works were written has been the subject of much discussion and dispute, but is now approximately settled. If he wrote the repulsive tragedy of 'Titus Andronicus,' it was probably as early as 1590; but the critics generally agree that it was an old play slightly retouched by him about that time. The three parts of 'Henry VI' are quite certainly other plays upon which he worked in the same way during his dramatic apprenticeship, the second and third parts having a considerably larger share of his work than the first part. When he attempted wholly original work, it was in comedy, and 'Love's Labour's Lost' was the play. The first version must have been written as early as 1591, the present one, printed in 1598, having been, as the title-page states, «newly revised and augmented.» 'The Two Gentlemen of Verona' and 'The Comedy of Errors' soon followed, together with the first draft of 'Romeo and Juliet,' which was afterward revised and enlarged. 'Richard III,' which naturally follows the trilogy of 'Henry VI,' appears, on the whole, to be entirely Shakespeare's, and was probably written in 1592 or 1593, and 'Richard II' soon afterward, though the earliest extant editions of both plays date only from 1597. 'A Midsummer Night's Dream' belongs in the group of early comedies, but was the last of the series, being generally ascribed to 1594.

'Venus and Adonis' appeared in 1593, and the poet, in the dedication to the Earl of Southampton, calls it «the first heir of my invention,» or imagination; but this seems to mean that it was his first *literary* production, plays in that day not being regarded as literature properly so called. The poem was published in 1593 and ran through at least 12 editions in the next 16 years. 'Lucrece,' also dedicated to Southampton, was published in 1594

and was almost as popular, eight editions being extant.

During the next six years (1595–1600) the poet completed the series of English historical plays (except 'Henry VIII'), the order apparently being 'King John' (1595), 1 and 2 'Henry IV' (1596, 1597) and 'Henry V' (1598). 'The Merry Wives of Windsor,' said to have been written at the request of Elizabeth, probably came between '2 Henry IV' and 'Henry V.' 'The Merchant of Venice,' written in 1596 or 1597, together with all the plays mentioned above, except 'Henry VI,' is included in a list of Shakespeare's dramas in Francis Meres's 'Palladis Tamia,' published in September 1598. 'The Taming of the Shrew' (based upon the anonymous 'Taming of a Shrew,' printed in 1594), though not mentioned by Meres, was probably produced in 1597, at the latest. Meres ascribes to Shakespeare a play entitled 'Love's Labour's Won,' which may be the 'Taming of the Shrew,' though many critics believe it to be an early form of 'All's Well that Ends Well.'

Between 1598 and 1600 the three brilliant comedies, 'As You Like It,' 'Much Ado About Nothing' and 'Twelfth Night' were written, but in what order is uncertain. 'Julius Cæsar' belongs to the same period. These plays were followed by 'All's Well that Ends Well,' 'Measure for Measure' and 'Troilus and Cressida,' the dates of all which are more or less doubtful; but these plays, which are comedies only in not having a tragic ending, seem to form a natural group, leading up to the period of the great tragedies, if not partly belonging to it. 'Hamlet' introduces the latter group, the earliest quarto edition having been printed in 1603. It was followed in 1604 by a second quarto, described as «newly imprinted and enlarged to almost as much again as it was.» 'Othello' was probably a new play when it was performed before King James in November 1604. 'Macbeth' is generally dated in 1606 or 1607, and 'King Lear' was produced at about the same time. 'Antony and Cleopatra' and 'Coriolanus' are supposed to have been written in 1607 or 1608.

The tragedies were followed by a group of three plays which have been aptly called «Romances»: 'Cymbeline,' 'The Winter's Tale' and 'The Tempest'; all written in 1609–11, and not improbably in the order mentioned. Campbell, the poet, believed that 'The Tempest' was the last of the plays, James Russell Lowell expressed the same opinion, and many critics agree with them, but some think that 'The Winter's Tale' was the later work.

Besides the plays of mixed or doubtful authorship belonging to Shakespeare's earliest period and 'The Taming of the Shrew,' there are several others of later date which appear to have a similar history: 'Timon of Athens,' 'Pericles' and 'Henry VIII.' Shakespeare's share in all of them is indisputable, but the critics disagree in explaining the divided authorship. The most plausible theory is that all three were begun by Shakespeare, but for some unknown reason were laid aside or left unfinished and afterward completed by others. In the case of 'Timon' it is neither known nor suspected who the other author was. In 'Pericles' it was undoubtedly George Wilkins who in 1608 (a year after the play was first printed) published a novel avowedly based upon it. The first two acts of the play appear to be his, but some believe that the later prose scenes and the Gower prologues are by a third hand. Large portions of 'Henry VIII' are evidently by John Fletcher, some of whose metrical peculiarities are unmistakable. The rest has been ascribed by one or two critics to Massinger, but there can be little doubt that it is Shakespeare's.

'The Two Noble Kinsmen' is another play which some excellent critics believe to be partly Shakespeare's. The title-page of the earliest edition (1634) ascribes it to «the memorable Worthies of their time: Mr. John Fletcher and Mr. William Shakespeare.» Fletcher's hand in it is obvious, but it is uncertain who was the other author. The anonymous play of 'Edward III' is ascribed to Shakespeare by certain German critics, and some in England believe that portions of it are his, but it is extremely improbable that he wrote a line of it. Sundry other plays were ascribed to him in his lifetime or afterward, but without authority or warrant.

The 'Sonnets' of Shakespeare were first published in 1609, but Meres in 1598 refers to his «sugred sonnets among his private friends,» and two of them were printed in 'The Passionate Pilgrim,' a piratical collection of verse, in 1599. It is probable that the majority of them were written between 1597 and 1601, but some may be of later date. 'A Lover's Complaint,' printed with the 'Sonnets' in 1609, is undoubtedly Shakespeare's. It is in the same stanza as 'Lucrece,' and internal evidence indicates that it was somewhat later than that poem. 'The Phœnix and the Turtle' must have been written before 1601, when it was printed as Shakespeare's in a volume with Chester's 'Love's Martyr' and poems by Marston, Chapman, Ben Jonson and others. In 'The Passionate Pilgrim,' besides the two sonnets mentioned above and two lyrics from 'Love's Labour's Lost,' several other poems are attributed to Shakespeare and printed in the modern editions of his works, but some of them are known to belong to other authors, and it is very doubtful whether any of the rest are his.

No collected edition of Shakespeare's plays appeared until seven years after his death, when the «first folio,» or the «folio of 1623,» was published. It was nominally edited by two of his friends and fellow-actors, John Heming (or Hemings) and Henry Condell, and contained 36 of the plays included in modern editions, 'Pericles' being omitted. Sixteen of the plays had been already published in quarto form, the other 20 were printed for the first time. The book evidently had no editing worthy of the name. Heming and Condell did little except to furnish the publishers with the best copies of the plays they could get; and these were partly manuscripts and partly early quartos, all of which had been used in the theatre by the actors in learning their parts. This is evident from the fact that in many instances names of actors are inserted at the beginning of speeches and in stage-directions instead of those of the *dramatis personæ*. Every conceivable form of typographical corruption and perversion abounds. It is estimated that at least 20,000 «readings» occur that are clearly wrong or highly suspicious, to say nothing of a far greater

number of minor misprints and mispointings. Verse is often printed as prose and prose as verse. Stage-directions and text are often confounded. Words and phrases from foreign languages are almost invariably corrupted, sometimes to such a degree that critics cannot decide whether they are Latin, French or Spanish. Some plays are divided into acts and scenes, some only into acts, some not at all, and the division is often confused or inaccurate. In face of all these facts the Baconian heretics claim that the folio was edited by Bacon, the plays being carefully revised, corrected and printed when he had abundant leisure for seeing them through the press.

The second folio (1632) was a reprint of the first, with few changes for the better and some for the worse. The third appeared in 1663, and was reprinted in 1664, with the addition of 'Pericles' and six plays falsely ascribed to Shakespeare. The fourth folio (1685) was a reprint of that of 1664, with no material change except that the spelling was somewhat modernized.

No other collected edition appeared until 1709, when Rowe's, based on the fourth folio, was published. The poems were first included in the second edition (1714). Of the other complete editions in the 18th century and the early part of the 19th, the most important were Pope's (1723–25), Theobald's (1733), Hanmer's (1744), Warburton's (1747), Johnson's (1765), Capell's (1768), Steevens's revision of Johnson's (1773), Malone's (1790), Steevens', with Boydell's illustrations (1791–1802), Reed's (1803), Chalmers' (1805) and the 'Variorum' of 1821, edited by James Boswell from a corrected proof left by Malone. Some of these were reprinted more than once.

Since 1821 editions, commentaries and critical and illustrative works on Shakespeare have so enormously multiplied that a list of them, even in the most concise form, cannot be added here. For the bibliography of the subject the reader may be referred to Lowndes's 'Library Manual' (Bohn's ed.); Franz Thimm's 'Shakespeariana' (1864 and 1871); and the 'Shakespeariana' (3,680 titles) of the 'British Museum Catalogue' (published separately in 1897).

The first complete American edition of Shakespeare (with life, glossary and notes by Dr. Johnson) was published in eight volumes in 1795–96, at Philadelphia. The first Boston edition (including only the plays) was in eight volumes (1802–04). Three editions of this appeared, each reset, stereotyping being then unknown. An edition of 17 volumes was brought out in Philadelphia in 1809, and one in seven volumes (edited by O. W. B. Peabody, though his name does not appear in it) in Boston in 1836. Reprints of Reed's text had been issued there in 1813 and 1814. An edition of the plays in 10 volumes (Reed's text) was published in New York in 1821 and again in 1824. The first critical, thoroughly annotated and illustrated American edition was G. C. Verplanck's (3 vols., New York 1844–47). Of more recent editions the only one that can be mentioned here is Horace Howard Furness's 'New Variorum' (the first since 1821, and on a far larger scale), of which 12 volumes have now (1904) been published. This country has also produced the first Concordance to the 'Poems' (Mrs. H. H. Furness's, 1874) and the best Concordance to the Complete Works (John Bartlett's, 1895). The first critical work on the plays from a *feminine* pen was 'Shakespeare Illustrated' (3 vols., London 1753–54), by Mrs. Charlotte Lennox (1720–1804), who was born in New York, where her father, Col. James Ramsay, was lieutenant-governor. From the age of 15 she lived in England. The dedication of this work to the Earl of Orrery was written by Dr. Johnson. See SHAKESPEARE'S SONNETS; and separate articles on the principal plays.

WILLIAM J. ROLFE,
Author of 'Life of Shakespeare.'

SHAKESPEARE, Authorship of. In the history of controversy over the authorship or the authenticity of writings two debates during the last 100 years have risen into special prominence — that relating to the Homeric poems and that which concerns the works commonly attributed to William Shakespeare. F. A. Wolf (q.v.), in his 'Prolegomena ad Homerum' (1795), essayed to demonstrate that the Homeric poems were not the work of any one man, but a compilation of rhapsodies composed by different minstrels and sung in the public assemblies while yet the art of writing was little known. Before this formidable attack upon the Homeric authorship there had been wide disagreement among critics upon various questions regarding the poems, including the probable date of their composition. Obscurities in respect to these matters are referred mainly to the lack of biographical materials relating to Homer himself. In this particular the case of Shakespeare is involved in almost equal difficulty, although it is not yet 300 years since the reputed dramatist's death. To many it seems scarcely less wonderful that the man who wrote the plays and poems known as Shakespeare's could have remained so far hidden from the world, despite its eager search for him, than that those writings should be the production of a person so obscure. When Hume declared miracles impossible because improbable, Whately, by a mock chronicle, reduced Napoleon to non-entity. But the non-existence of Shakespeare is not asserted in the controversy. They who dispute his authorship base their denial mainly upon antecedent improbability, as Hume did his argument against miracles. Indeed one conspicuous champion of Shakespears asks: "Why is it not the simplest plan to let Shakespeare stand as a simple miracle?" regarding him as "a much simpler miracle than he would be if any of the current explanations of him were accepted." Critical inquiry, however, still seeks and will seek a cause equal to the effect, a man or men adequate to the result to be accounted for.

Although this authorship controversy, in various phases, had earlier beginnings, it assumed its most definite character about the middle of the 19th century, since when, as Brandes complains, the great name of Shakespeare has been "besmirched by American and European imbecility." "A troop of less than half-educated people," he declares, "have put forth the doctrine that Shakespeare lent his name to a body of poetry with which he had really nothing to do — which he could not have understood, much less have written? Brandes ('William Shakespeare' (1899) cites W. H. Wyman's 'Bibliography of the Bacon-Shakespeare Controversy' (1884), showing that "there had been published up to that date 255 books, pamphlets and essays as to the authorship of Shakespeare's plays. In America 161 treatises of considerable bulk had been devoted to the question, and in England 69. Of these, 73 were decidedly opposed to Shakespeare's authorship, while 65 left the question undetermined. In other words, out of 161 books, only 23 were in favor of Shakespeare. And since then the proportion has no doubt remained much the same."

The anti-Shakespearian view consists of two main theories, that of a composite or a "syndicate" authorship, and that of a single authorship. If the latter be regarded as involving almost a miracle, the other, it has been declared, suggests a combination of miracles. If there was great collaboration there must have been also one master genius whose primacy reduced all partnership to practical insignificance. Yet that there was partnership is evident from the discoveries of critics who show where different hands have set their marks in the plays and poems called Shakespeare's.

The view of single authorship, other than Shakespeare's, as mainly held, is known as the Baconian theory. The earliest recorded surmise that the real author of the Shakespearian writings was Francis Bacon appears to have been that of "a Mr. William Smith," in a privately-printed letter to Lord Ellesmere (1856), basing his opinion on Shakespeare's obvious incapability of producing the works attributed to him, and on the manifold qualifications of Bacon. About the same time Delia Salter Bacon, an American woman, gave a more considerable form to this theory ("delusion," Brandes calls it) in a number of magazine articles, succeeded by a volume, 'The Philosophy of the Plays of Shakespeare Unfolded' (1857), in which she set forth the deficiencies of the "Stratford butcher-boy" and "poacher" in contrast to the attainments of Bacon, to whom she assigned the principal part in the authorship of the plays. She was followed by Nathaniel Holmes, an American jurist and a writer of much literary skill, in a work, 'The Authorship of Shakespeare' (1866, 1886), vigorously supporting the Baconian theory, and giving increased importance to the discussion. Meanwhile a new phase of the subject began to appear in alleged discoveries of a cipher in the plays embodying a confession of his authorship by Bacon himself. This line of investigation was followed by Ignatius Donnelly, an American lawyer and politician, in what Brandes calls "his crazy book," 'The Great Cryptogram: Francis Bacon's Cipher in the so-called Shakespeare Plays' (1st part 1888). This inquiry was further pursued by Donnelly up to his death, and has been continued by others; notably, in America, by O. W. Owen of Detroit, Isaac Hull Platt of New York, and the late R. M. Bucke of London, Ontario. For an exposition of Bacon's anagram, which Platt claims to have discovered in the plays, as well as of Bucke's views, consult "Francis Bacon" in Bucke's 'Cosmic Consciousness' (1901). Apart from the cipher theory, the general reliance of the Baconians is upon points summed up by John Weiss, a reasonable defender of the traditional authorship, in 'Wit, Humor and Shakespeare' (1876), as follows: "The plays are too great, and out of all proportion to the obscurity which rests upon Shakespeare's life, and to the insignificance of his contemporary fame. They are filled with all kinds of classical allusion, professional information, legal, medical, horticultural, scientific, to an extent which an obscure play-actor could not possibly comprise within the limits of his ragged and scanty education. The plays contain remarkable parallelisms with passages in Bacon's works, and coincidences of thought and expression." This is perhaps as fair a summary as could be made in so few words; but the Baconians multiply instances and arguments with great extension and cumulative force, finding in Bacon's 'Promus' especially, but also in many places throughout his writings, words and passages which they cite in proof.

Among suggesters and advocates of the "syndicate" theory is Appleton Morgan of New York, who in his work 'The Shakespearean Myth' (1880), advanced the view that the plays were jointly produced by at least two men, one a poet and dramatist, the other a business man connected with a theatre; and in later writings this author has amplified this conjecture, which has also been elaborated by "A Cambridge Graduate" in a volume entitled 'Is It Shakespeare?' (1903). It is likewise set forth by William H. Edwards in 'Shaksper not Shakespeare' (1900). "It is enough for me," he says, "to prove that William Shaksper did not write these plays. Who did, I know not, and offer no suggestions: but when the venerable Shakespeare image has tumbled, and the critics have a little time to clear their eyes of dust and cobwebs, the real authors may be discovered — authors, for I believe there were several associates who wrote under the assumed name of 'William Shakespeare.'"

Toward all this anti-Shakespearian argument the general attitude of writers on the other side has been that of ridicule and contempt. The persistence of the unorthodox, however, has compelled, in the interest of the Shakespeare cause, as well as in that of free scholarship and fair investigation, a more serious attention on the part of those who would uphold the traditional view. The burden of proof thus far is on the unorthodox, and of necessity their proofs hitherto are chiefly negative. But so too are the arguments of their opponents, who, at least with respect to Bacon, can do little more than set one great improbability against another, adducing also whatever they can of a positive nature from scanty documentary sources, the witness of Shakespeare's contemporaries, oral tradition, and the like. The consensus of Shakespearians on the conservative side finds in these evidences probabilities at least in which they are content to rest until overcome by resistless demonstration. To the Baconians their answer is perhaps sufficiently conveyed in the conclusion of Sidney Lee in his 'Life of William Shakespeare' (1898): "The abundance of contemporary evidence attesting Shakespeare's responsibility for the works published under his name gives the Baconian theory no rational right to a hearing; while such authentic examples of Bacon's effort to write verse as survive prove beyond all possibility of contradiction that, great as he was as

a prose-writer and a philosopher, he was incapable of penning any of the poetry assigned to Shakespeare." And yet, in view of all that has followed from the work of Delia Bacon, it seems proper to repeat Emerson's remark, that she opened this question "so that it can never again be closed," at least until positive proofs on one side or the other shall be produced. Meanwhile a liberal spirit of investigation can hardly deprecate the controversy which has already thrown so many side lights upon the Shakespearian literature and tradition. Besides the above works cited, of which Wyman's 'Bibliography' is especially important as a source of reference, a few of the more recent writings on the subject may be mentioned.

Bibliography.— White, 'Studies in Shakespeare' (1886); Stopes, 'The Bacon-Shakespeare Question Answered' (1889); Owen, 'Sir Francis Bacon's Cipher Story Discovered and Deciphered' (1893–94); Reed, 'Bacon vs. Shakespeare: a Brief for the Plaintiff' (7th ed., 1897); 'Bacon and Shakespeare Parallelisms' (1902); 'Francis Bacon Our Shakespeare' (1902); Allen, 'Notes on the Bacon-Shakespeare Question' (1900); Bayley, 'The Tragedy of Sir Francis Bacon: an Appeal for further Investigation and Research' (1902); Crawford, 'The Bacon-Shakespeare Question' (in 'Notes and Queries,' series 9, Vols. IX–XI, 1902–03); Gallup, 'The Bi-literal Cypher of Sir Francis Bacon' (1902); Mallock, 'Last Words on Mrs. Gallup's Alleged Cypher' (in *Nineteenth Century and After*, Vol. LIV, pp. 55–71, 1902); 'A New Light on the Bacon-Shakespeare Cypher' (1902); 'New Facts relating to the Bacon-Shakespeare Question' (in the *Pall Mall Magazine*, Vol. XXIX, pp. 77–89; 215–228, 1903); Lang, 'Mrs Gallup and Francis Bacon' (in *Monthly Review*, Vol. II, pp. 146–162; 1902); Webb, 'The Mystery of William Shakespeare: a Summary of Evidence' (1902); Boubée, 'Shakespeare ou Bacon?' (1903); the various writings on the subject by Edwin Bormann, published in Leipzig (1895–1903); and the publications of the Bacon Society. The latest work is entitled 'The Greatest of Literary Problems,' which is a history of every phase of the controversy, and contains a bibliography covering works in every European country (Boston 1915).

SHAKESPEARE SOCIETIES. The first Shakespeare society was founded in 1841, in London, and before its dissolution in 1853, had published 48 volumes. A new English Shakespeare society was organized in 1874, and the German Shakespeare Society was founded at Weimar in 1864. In the United States the Shakespeare Society of New York was organized in 1885. The latter has published the 'Bankside Shakespeare' (20 vols., 1888–92) and 'The Bankside Restoration Shakespeare' (1907). The Shakespeare Association was founded in London in 1914 and Mr. Israel Gollancz was chosen first president. The publications of the various societies have done much for Shakespearean scholarship through verse texts and publishing the text of the quartos alongside the texts of the early folios.

SHAKESPEARE'S SONNETS. The Sonnets of Shakespeare were published in 1609, in a small quarto volume which is generally thought to have been "piratical," that is, to have been issued without the author's consent. The circulation of poems in manuscript form was a common matter in the Elizabethan age, and there is direct evidence that it had been taking place in the case of these sonnets; for Francis Meres, in a little work called 'Palladis Tamia,' published 1598, observed: "As the soul of Euphorbus was thought to live in Pythagoras, so the sweet witty soul of Ovid lives in mellifluous and honey-tongued Shakespeare, witness his 'Venus and Adonis,' his 'Lucrece,' and his sugared Sonnets among his private friends." In the following year, 1599, two of the sonnets were published in the piratical compilation called 'The Passionate Pilgrim.' For these and other reasons it is assumed that a good part of Shakespeare's Sonnets had been written a considerable time before the publication of the volume of 1609; but as to the period of his life most likely to be represented by them, there is no general agreement. Some critics regard them as early compositions, largely completed by 1594–96; others as having been written largely in the period 1598–1603; while still others assume, in the absence of definite evidence, that they may have been produced at intervals throughout Shakespeare's literary life. It is agreed, however, that few are to be attributed to his later period, that is, after 1603.

The Sonnets are 154 in number, and are written in the form sometimes called "English" to distinguish it from the more orthodox "Italian" sonnet form; that is, each of them is divided into four quatrains and a final couplet, by the rhyme-scheme *abab, cdcd, efef, gg*. This form had already been used successfully by Samuel Daniel in a popular collection of sonnets, and it is to his influence that the general form and style of Shakespeare's are most commonly traced; though it is also likely that he had studied the sonnets of Sir Philip Sidney, by far the finest sonneteer of the early Elizabethan age, and perhaps those of Michael Drayton as well. How far Shakespeare was acquainted with the work of Italian and French sonneteers we have no means of knowing. None of his sonnets appears to be a translation or direct imitation of a particular source; on the other hand, the themes and rhetorical methods of the continental poets abound in his sonnets, as in those of his English contemporaries, and there is no reason to doubt that he was familiar with the general character and course of the sonnet-writing fashion, which came into England from Italy and France, and reached its height there about 1594–96. A great part of these Renaissance sonnets were issued in the form of "sequences," that is, collections centred around a single theme,— usually a woman (real or ideal) beloved by the poet,— and capable of being read either as single poems or as a connected account of the poet's subjective experiences. In the case of Shakespeare's Sonnets, it is disputed whether they are to be regarded as forming a sequence or not. They have no title or otherwise clearly defined theme; and we cannot say whether they were printed from a single manuscript or from scattered collections, nor whether the order in which they stand in the quarto of 1609 is that in which they were written or that in which they would have been published if Shakespeare had prepared them for the press. Hence the only evidence as to the unity of the series is internal; and many critics find themselves able to read it as a connected story, while to others it seems to be a mere miscellany, though containing many pairs, trios, and perhaps larger groups of sonnets intended to be read connectedly. The weight of opinion may be said to be that there is a certain unity in the collection, suggestive of the view that the great part of the sonnets have to do with the same persons and events, but that there is no complete continuity such as would result from an authoritative arrangement either for narrative or lyrical ends. As a result of this uncertainty regarding the arrangement of the Sonnets, they have been rearranged by many editors and critics, in accordance with individual theories. Perhaps the most plausible and useful of these rearrangements is that of C. M. Walsh, in his edition of 1908; this is based not on any constructive theory, but on the effort to group the sonnets according to internal evidence as to content and style, and therefore errs — if at all — in the direction of an unnecessary breaking up of possible sequences.

The opening sonnets, as they stand in the volume of 1609, are addressed to a young man, apparently of good family and striking personal charms and gifts, who is urged by the poet to marry in order that he may beget children to perpetuate his qualities and so, in a sense, overcome the ravages of time and death. Many of the following sonnets apparently either refer to or are addressed to the same young gentleman, and it is *possible* to read every one of them, up to and including the 126th, as having reference to this person,— though many of the number, if standing by themselves, would be assumed to be addressed to beautiful women. For this reason Sonnets 1–126 are frequently called the First Series, and it is assumed that they came into the publisher's hands as a body. Moreover, the sonnets from 127 to 152 inclusive have chiefly to do with a woman, dark of complexion and dark of character, and all of these *can* be read as concerned with this theme; hence this group is frequently called the Second Series. (Sonnets 153 and 154 admittedly stand quite by themselves as mere literary exercises.) A link between the two "series" is found in the fact that Sonnets 40–42 on the one hand, and 133–136 on the other, appear to refer to the same event, namely, an intrigue between the beautiful young man and the dark woman, in which it would seem that both proved untrue to their poet friend. Sonnet 144 may be viewed as the more definite key to this triangle; it is the famous poem in which the writer speaks of having "two loves":

> "The better angel is a man right fair,
> The worser spirit a woman colour'd ill."

Obviously, this group of sonnets raises with peculiar interest the question which attaches in some form to most of the sonnet sequences, — how far the writer speaks literally of himself, that is autobiographically, how far conventionally or imaginatively. Students of Shakespeare's Sonnets have differed widely, sometimes bitterly, on this question, and all possible answers to it may be found, ranging from the extreme view that the story is a wholly imaginative one, with no more reference to Shakespeare's personal life than that of Romeo or Othello, to the opposite extreme, that we have in his Sonnets a perfectly clear and definite record of his friendship for an attractive but faithless young man and a repulsive yet strangely fascinating woman. The interpreters of the latter sort have also made strenuous efforts to identify the persons concerned; a number of them, in particular, having determined that the young man friend is Henry Wriothesley, Earl of Southampton, others being equally certain that he is William Herbert, Earl of Pembroke. The dispute is complicated by the curious circumstance that the publisher of the Sonnets dedicated them to a "Mr. W.H.," whom he called their "only begetter," and it has been assumed that this should give a clue to the person addressed in the "First Series." All these matters are still in debate, and there is no reason to expect any unquestioned solution. In general, modern criticism tends to agree on the view that a good part of these sonnets, including those concerned with the intrigue with the dark woman, were of definite personal significance (chiefly because, if Shakespeare had set out to tell an imaginative tale, he would have done it better and more clearly than he has told this one), but at the same time that they represent conventional moods and manners familiar to Shakespeare's contemporaries, and are therefore not to be taken so seriously by students of his life as many have done. It is certain that none of the attempted identifications has been proved.

The disputes concerning the arrangement and the biographic significance of the Sonnets have tended to obscure the question of their poetic qualities. In general, here as with Renaissance poetry as a whole, it is necessary to distinguish between qualities peculiar to that age and those of permanently vital character. Chief among the former group is Shakespeare's use of the "conceit,"—that is, the ingenious elaboration of a verbal or imaginative figure,— a habit common to most of the Renaissance lyrists, and consonant with Shakespeare's taste, especially in his more immature periods. Notable examples of this are to be found in Sonnets 8, 24, 43, 46–47, 99, 132, 135–136 and 145. As a lyrical method this is of course opposed to the canons of modern taste, and in the 18th century, when criticism was disposed to deal with special severity with Renaissance ingenuities, the poems of Shakespeare suffered a corresponding depreciation; Steevens, one of the leading editors of the plays, refused to admit them to his edition of the Works of Shakespeare, saying that no Act of Parliament would compel readers for the Sonnets. On the other hand, it is now universally admitted that in many of these sonnets we have unsurpassed examples of the power of lyrical poetry to express personal feeling in concentrated form. In particular, they deal with the theme of the struggle of human love and beauty against the arch-enemies Time and Death — now representing these enemies as triumphant, now finding in poetry a means of overcoming them, but chiefly finding such a means in the unconquerable power of love.

From this standpoint Sonnet 116 may be viewed as the climax of the collection:

> "Love alters not with his brief hours and weeks,
> But bears it out even to the edge of doom."

Other sonnets of importance for their content or lyrical beauty are 18, 29, 30, 31, 52, 55, 60 64, 71, 73, 74, 90, 97, 102, 106, 129, 146.

The most extensive discussion of the Sonnets, for the general reader, is found in Sidney Lee's 'Life of Shakespeare'; it represents a rather extreme position on behalf of the conventional as distinguished from the personal interpretation. Among the convenient editions are those of Beeching (1904), Walsh (1908), Rolfe (1905), and that in the 'Tudor Shakespeare' (1913); for criticism, see the introductions in all these. The original text of the Sonnets is reproduced in the edition in the 'First Folio Shakespeare' (1912); and a complete apparatus, including the history of the criticism of the Sonnets, is in the variorum edition of R. M. Alden (1916).

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SHAKTAS. See RELIGIOUS SECTS.

SHALE, a sedimentary rock made up largely of compacted clay with admixture of other finely ground rock material, and splitting into thin layers parallel to the bedding plane. In the typical shales the rock splits with a conchoidal or shelly fracture, the surface being marked by wide shallow depressions rather than by absolute smoothness. In composition, shales may be purely argillaceous, but they are generally more or less silicious, calcareous, ferruginous or carbonaceous, according to the material admixed with the clay. The carbonaceous shales are often used for the manufacture of oil or gas, some of them being so rich in carbon as to burn with a bright flame. These are called oil shales, or kerosene shales. Alum shales are clay shales rich in iron pyrites which on decomposing permits the formation of sulphuric acid, which in turn reacts upon the clay shale with the formation of alum. Calcareous shales are largely used in the manufacture of Portland cement.

SHALER, shā'lẽr, **Alexander,** American soldier: b. Haddam, Conn., 19 March 1827; d. 1911. He was educated in private schools and graduated from Brainard Academy in 1844. In 1845 he joined the Washington Grays (later known as Eighth regiment New York State militia) and transferred to the Seventh regiment in 1848, becoming major of that regiment in 1860. He was commissioned lieutenant-colonel of the 65th New York Volunteers on the outbreak of the Civil War, and became colonel in 1862, commanding the military prison at Johnson's Island, Ohio, during the winter of 1863–64. He served with the Army of the Potomac, participating in all its battles, until 6 May 1864, when he was taken prisoner at the battle of the Wilderness, and was held in Charleston, S. C., during the summer of that year. After his exchange he commanded a division in the Seventh corps and the post of Duval's Bluffs, Ark., serving in the Southwest until he was mustered out 24 Aug. 1865. He was commissioned brigadier-general of volunteers in 1863, and brevetted major-general of volunteers in 1865. From 1867 until 1870 he was president of the board of commissioners of the Metropolitan fire department, and commissioner of the fire department of New York 1870–73. He was consulting engineer to the Chicago board of police and fire 1874–75, being charged with the reorganization and instruction of the fire department of that city. From 1867 till 1886 he was major-general of the first division of the National Guard of the State of New York, and was an organizer and president of the National Rifle Association of the United States. While a member of the board for the purchase of sites for armories he was accused of bribery, but although he was tried twice the jury disagreed each time. General Shaler published a 'Manual of Arms for Light Infantry Using the Rifle Musket' (New York 1861).

SHALER, Nathaniel Southgate, American geologist: b. Newport, Ky., 20 Feb. 1841; d. Cambridge, Mass., 10 April 1906. He was graduated from the Lawrence Scientific School, Harvard, in 1862, served in the Union army as an artillery officer, and then returned to the Lawrence School, where he was assistant and instructor in geology and zoology He accepted the chair of palæontology at Harvard in 1868, was transferred in 1887 to that of geology, and he was dean of the Lawrence School from 1891. In 1873–80 he was in charge of the Kentucky geological survey, and from 1884 was director of the Atlantic division of the United States geological survey. He was commissioner of agriculture for the State of Massachusetts at different times, was president of the Geological Society of America in 1895; and besides numerous reports for the United States geological survey published 'Kentucky Geological Reports and Memoirs' (7 vols., 1876–82); 'The Story of Our Continent' (1892); 'The Interpretation of Nature' (1893); 'The United States of America' (2 vols., 1894); 'The Individual: Study of Life and Death' (1900); 'The Citizen: A Study of the Individual and the Government' (1904); 'The Neighbor' (1904); 'Man and the Earth' (1905). Consult 'The Autobiography of Nathaniel Southgate Shaler,' with a memoir by his wife (New York 1909), etc.

SHALLOON, a light woolen textile said to derive its name from Châlons in France, where it was originally manufactured.

SHALLOP, a light fishing-vessel with two masts and carrying lug or fore-and-aft sails; also a small boat for one or two oarsmen.

SHALLOT, or **ESCHALLOT,** a perennial bulbous plant (*Allium ascalonicum*) of the order *Liliaceæ*. The bulbs are seldom two inches long and an inch in diameter. They send up hollow small leaves which are often used for mixing with salads and dressings, or are eaten alone. The bulbs are also similarly used. They are planted in early spring in rich soil about four inches apart, in rows 15 to 18 inches apart, and kept cleanly cultivated throughout the season. The leaves may be cut at any time and the bulbs taken up in autumn, dried like onions or garlic, and kept in a dry, cool place. From two to six bulbs are usually produced by each bulb planted. In the South they are generally planted in the autumn and even in the North they may be left in the ground over winter. They are less grown in the United States than in Europe.

SHALMANESER, shăl-ma-nē'zẽr, third of his name, the Assyrian king, who in 853 B.C. defeated Benhadad with his ally, Ahab, king of Israel, at Karkar, the Biblical Kir-haraseth (2 Kings iii, 25), on the Orontes. Shalmaneser did not gain a decisive victory over his foes, as he was unable to proceed to Damascus and to wage war against his other enemies; he was worsted in battle by the Chaldians of Armenia. See AHAB ASSYRIA.

SHAMANISM, a vague term used by explorers of Siberia in the 18th and 19th centuries to designate not a specific religion but a form of savage magic or science, by which physical nature was believed to be brought under the control of man. It prevails among Turanian and Mongolian tribes and American Indians, and blends with their varied religious beliefs and customs. Shamanism rests for its basis on the animistic view of nature. Animism teaches that primitive and savage man views the world as pervaded by spiritual forces. Fairies, goblins, ghosts and demons hover about him waking or sleeping; they are the cause of his mishaps, losses, pains. Mountains, woods, forests, rivers, lakes are conceived to possess spirits, and to be living, thinking, willing, passionful beings like himself. In respect to these, man is in a state of helplessness. The shaman by appropriate words and acts uses his power to shield man and envelops him in a kind of protective armor so that the evil spirits become inactive or inoffensive. His rôle is that of antagonist to the spirits and of guardian to ordinary man. The Eskimos believe all the affairs of life are under the control of malignant spirits who are everywhere. These minor spirits are subject to the great spirit Tung-Ak, yet must be propitiated. The shaman alone is supposed to be able to deal with the great spirit, though not superior to him. The main principle of Shamanism is the attempt to control physical nature. Hence the term embraces the various methods by which the spirits can be brought near or driven away. The belief that the shaman practises this magic art is universal among savages. To this art nothing seems impossible; it intimately affects their conduct and is reflected in their myths. In some cases initiation is required. Thus with the Navajo and Ojibwas they who have successfully passed through the four degrees of the *medéwin* are called *medé*, and are considered competent to foresee and prophesy, to cure diseases and to prolong life, to make fetishes and to aid others in attaining desires not to be realized in any other way. They who have received instruction in one or two degrees usually practise a specialty, e.g., making rain, finding game, curing diseases, For this women are eligible. Most commonly the shaman is a man. Among the Yakuts, the Carib tribes and in northern California there are female as well as male shamans; and in some cases male shamans have to assume women's dress. Every Maori warrior is a shaman. In Samoa there is no regular caste, but in other Polynesian groups the shaman is the exclusive privilege of an hereditary class of nobles. In the practice of his art the shaman is regarded as (1) a healer, hence the term «medicine man,» and the secret medicine societies of the Seneca, and of other American tribes; (2) an educator, i.e., the keeper of myth and tradition, of the arts of writing and divination; he is the repository of the tribal wisdom; (3) a civil magistrate; as seers possessing secret knowledge with power at times of assuming other shapes and of employing the souls of the dead, they are credited with ability to detect and punish crimes; (4) a war-chief; thus with the Dakotas and Cheyennes the head war-chief must be a medicine-man. Hence the shaman possesses great influence and in many cases is the real ruler of the tribe. The means which he uses are (1) symbolic magic, on the principle that association in thought must involve similar connection in reality; (2) fasting with solitude and very generally bodily cleanness and incantations usually in some ancient or unmeaning language and at times obscene; (3) dances and contortions with use of rattle and drum and a distinctive dress decked with snakes, stripes of fur, little bells. The frenzy and contortions lead to an ecstatic state which is considered of the greatest importance. In South America drugs are used to induce stupor; (4) possession; thus in Korea the *pan-su* is supposed to have power over the spirits, because he is possessed by a more powerful demon whose strength he is able to wield.

Shamanism is closely akin to fetishism, and at times it is difficult to tell whether the practices in vogue among certain peoples should be referred to the one or to the other. Both spring from Animism; both are systems of savage magic or science and have certain rites in common. Yet the differences consist in the belief that in fetishism the magic power resides in the instrument or in particular substances and passes into or acts upon the object, whereas in shamanism the will-effort of the magician is the efficient factor in compelling souls or spirits or gods to do his will, or in preventing them from doing their own. Shamanism takes for granted the theory that fear is the origin of religion. Shamanism is not a religion. The religious priest beseeches the favor of the gods; the shaman is believed to be able to compel and command them to do his will. Hence the term is not to be regarded as a name for a principal form of religion but for important phenomena and tendencies of Animism. Consult 'Reports of the Bureau of American Ethnology' (Washington, D. C., annually); Achelis, T., 'Moderne Völkerkunde' (Stuttgart 1896); id., 'Abriss der vergleichenden Religionswissenschaft' (Leipzig 1904); Frazer, J. G., 'The Golden Bough' (New York 1900–12); Müller, 'Contributions to the Science of Mythology' (London 1897); Lang, 'Myth, Ritual and Religion' (ib. 1887); Keane, 'The World's Peoples' (New York 1908); Furlong, 'The Faiths of Man' (London 1906); *Journal* of American Folklore (January 1908); Tumholtz, C., 'Unknown Mexico' (New York 1902); Tylor, 'Primitive Culture' (2d ed., New York 1889).

SHAMASH, or **ŠAMAŠ,** the sun god of Babylonia and Assyria. Inscriptions designate him as the offspring of Sin, the moon god, the moon power in the earlier, nomadic times being

the dominant deity. With the development of agriculture the importance of the sun god grew and he became one of a triad with Sin, the moon god, and Ishtar, the earth god. To Shamash were attributed powers of justice and right, evil being supposed to flee before the power of light, and he was likewise the god of healing. His wife was A, Aa, Or Ai, and in inscriptions is the "lady of mankind" and the "lady of the countries." His children were Kettu (justice) and Mesharu (right), although these are also referred to with other minor sun gods, such as Bunene, as servitors of Shamash. Ninib, the sun god of the morning and of spring, and Nergal, god of moon and summer, however, retained their powers under the headship of Shamash. The principal places of worship were Sippara, the Sepharvaim of the Bible; and Larsa, the modern Senkereh; the sanctuary in both cities being called E-barra or E-babbara, "the shining house." Other temples of his worship were built at Babylon, Ur, Nippur and Nineveh.

SHAMOKIN, sha-mō'kin, Pa., borough in Northumberland County, on the Phliadelphia and Reading and Pennsylvania railroads, about 45 miles north by east of Harrisburg, the capital of the State. It was settled in 1835 by people employed in developing the coal mines. It was incorporated as a borough in 1864. It is the industrial and commercial centre of a region rich in anthracite coal. The chief industrial establishments are foundries, machine shops, silk and knitting and planing mills, flour mills, brickyards, and a large number of the inhabitants of the borough are employed in the mines in the vicinity. The borough has an extensive trade in coal and in iron products and in knit goods. There are several churches, free high schools, public and parish schools, and a public library. The banks, national and State, have a combined capital of over $500,000. The government is vested in a chief burgess and a council. The majority of the inhabitants are native born, but there are a number from Wales, Poland, Hungary and Germany, also from England, Ireland and Scotland. Pop. (1920) 21,204.

SHAMROCK, a name derived from the Irish *seamrog,* meaning "trefoil," and applied to various trifoliate plants native to Ireland, and even to the water-cress (which is not three-parted). Each is said to be the plant picked by Saint Patrick as a symbol to illustrate the doctrine of the Trinity. The Shamrock is worn on Saint Patrick's Day, 17th of March, and has come to be regarded as the national plant of Ireland. The black medic (*Medicago lupulina*), *Oxalis acetosella,* various clovers, such as the common red clover (*Trifolium pratense*), a trailing hop-clover, with small leaves and yellow heads (*Timinus*), and the common low, white clover (*T. repens*), are widely sold as the "true" shamrock, and exported in large quantities to the United States and other countries, where Irishmen make a custom of wearing the sprays on Saint Patrick's day as a reminder of home associations.

SHAN-HAI-KWAN, shān-hī-kwān, China, a town in the province of Chi-li, situated on the Gulf of Liao-tung, on the Manchurian boundary, and at the point where the Great Wall reaches the sea. It is a station on the Northern Railroad, and a point of great strategic importance. Being a Chinese garrison town, it was occupied during the Boxer troubles of 1901 by troops of the allied Powers. It consists of the inner town devoted to trade, the eastern town, which is occupied by officials and troops, and the western town which is occupied by tradespeople and troops. It has large railroad repair shops. Pop. 30,000.

SHAN-SI, shān-sē, China, an inland northern province, bounded east by Chi-li and Hen-nan, south by Hu-nan, west by Shen-si, and north by Mongolia and the Great Wall; area, 81,830 square miles. Its rugged surface contrasts strikingly with the level tracts in some of the surrounding provinces, although the lowland parts of it are represented as being well cultivated and terraced. The rivers, which are almost all tributaries of the Hwang-ho or Yellow River, are numerous, but not large. The Fen-ho, the largest of these streams, is about 300 miles long and falls into the Yellow River near the southwest corner of the province, after draining the central part. The north contains some of the favorite hunting grounds of the wealthier Chinese, and the inhabitants find sources of wealth in the coal, iron, cinnabar, copper, marble, lapislazuli, jaspar, salt and other minerals, which it affords. The principal grains are wheat and millet, besides a great variety of vegetables, with grapes and other fruits. Tobacco is cultivated in the southern half of the province. Besides Tai-yuan, the capital, there are several populous towns in the province. This province is the original seat of the Chinese people and many of the events recorded in their ancient annals occurred within its borders. Pop. 12,200,500.

SHAN (shān) **STATES,** Indo-China, a series of petty states on the east of Burma and north of Siam, occupying an area not well defined. The northern part of the Shan country comprises the North and South Shan states, belonging to British Burma, and the southern part, the Laos or Siamese Shan states belonging to Siam. The Shans are descendants of an aboriginal race from the mountains on the western borders of China and are closely allied to the Laos and the Siamese. They are an indolent, laughter-loving people, fond of gambling and cock-fighting, not unwarlike, though orderly and fairly trustworthy; the women have great influence and enjoy equal freedom with the men. Slavery, however, exists, but in a mild form, and serfdom is general. While the chief employment is agriculture, there are noted manufacturers of chased work in gold and silver. The rule of the native chiefs is generally just and mild, and taxation is light. Buddhism is the dominant religion, though it is mingled with many superstitious practices. See LAOS; LOLOS and SIAM.

SHAN-TUNG, shān-toong', China, a northern maritime province bounded north and west by Chi-li, southwest by the Gulf of Pe-chi-li and the Yellow Sea, and south by Kiang-su and Hu-nan; area, 55,970 square miles. The climate is very bracing; the rainfall extends from April to September. The greater portion of this province is level, but the peninsular parts of it are hilly. The shores are generally bold and full of indentations, some of which

are excellent harbors. Wei-hai-wei leased to the British, Kiao-chau, formerly leased to Germany, and the native towns Teng-chau and Chi-fu are the only important seaport towns along the entire coast. The province is intersected by several rivers. The only large one flowing direct to the sea is the Yellow River or Hwang-ho, which, after traversing the province in a northeast direction, flows into the Gulf of Pe-chi-li. The inland navigation is augmented by the grand canal which traverses the west part of the province northwest to southeast, affording great trading advantages, and the transit trade is extensive. Drugs and vast quantities of vegetables are exported, and felt caps, carpets and some coarse hempen cloths are manufactured. Pongee silk and straw-braid are exported in large quantities. The province is over-peopled, and the great proportion of the people are poor; still they appear to be contented and attach peculiar importance to this province, on account of its being the birthplace of Confucius and his disciple, Mencius, and also because it contains the Tai-shan, or Great Mount, which forms a favorite resort of devotees from amazing distances. Its capital is Tsi-nan. Pop. 25,810,000.

By a convention signed 6 March 1898 Germany obtained the so-called Kiao-Chau concession, giving her special privileges in a belt 33 miles wide running around Kiao-Chau Bay, which included the right to move troops, but with the specification that the territory in this zone was still under Chinese sovereignty. It also gave to Germany the Treaty Port of Tsing-tao where fortifications were erected and the Germans enjoyed extraterritorial immunity from Chinese interference. It also conferred the right to grant concessions for two railways in Shantung province (afterward extended) and a railway zone 20 miles wide in which mining operations could be carried on under German direction and by German capital. Under the terms of this treaty Tsing-tao was built and fortified, the Tsing-tao-Tsinan Railway was constructed and mining operations were started. Shantung was looked upon as Germany's sphere of influence. In 1914 Japan declared war upon Germany and announced that she would support Great Britain's interests by taking Tsing-tao. Yuan Shih-kai offered to bring China in as an ally and take it but was dissuaded. A Japanese fleet blockaded the German treaty port, supported by British and French vessels and a Japanese military force approached Tsing-tao overland from Lungkow and with a small British contingent, besieged it. After a short struggle the Germans surrendered and the Japanese expeditionary force occupied the place. In 1915 21 demands were presented to China, secretly, and were discussed in conferences, at which the Japanese permitted no minutes to be taken. The Chinese were forced to agree that they would abide by any decision reached between Japan and Germany at the Peace Conference. In 1917 before America and China entered the war, Japan extracted from Great Britain, and later from France and Italy, a pledge that she would be supported in her claim upon Tsing-tao at the Peace Conference. Already in 1914 Japan had announced that she proposed to return Kiao-Chau to China with full sovereignty. The entry of China in the war against Germany completely altered the status of the Shantung question, of which the disposition now clearly was a question between China and Germany and not as before between Germany and Japan. The latter apparently saw the weakness of her position and in September 1918 negotiated a secret agreement with Tsao Ju-lin, who acted without the knowledge of Parliament or the Cabinet. By this agreement Japan came into possession of Germany's former claim upon projected Shantung railways. This was the status of the Shantung question when the Peace Conference began its sessions in Paris. Japan was armed with five treaties and agreements. Faced with these documents the representatives of the great nations at the Conference, instead of ignoring or tearing up the documents, gave Japan's claims the following consideration in the final draft of the terms submitted to Germany:

> "Germany cedes to Japan all rights, titles, and privileges, notably as to Kiao-Chau, and the railroads, mines and cables acquired by her treaty with China of 6 March 1898, and by other agreements as to Shantung.
>
> "All German rights to the railroad from Tsing-tao to Tsinanfu, including all facilities and mining rights and rights of exploitation, pass equally to Japan and the cables from Tsing-tao to Shanghai and Chefoo, the cables free of all charges; all German state property, movable and immovable, in Kiao-Chau is acquired by Japan free of all charges."

This award to Japan aroused the Chinese nation as nothing else had done in their history. It also caused hostile comment in the United States, many Senators being reluctant to vote for the ratification of the treaty with this provision included. Japan announced once more that she would return the province to China, but no date was specified for the fulfilment of this promise. See WAR, EUROPEAN — PEACE CONFERENCE.

SHANGHAI, shăng-hī', China, a seaport city, the most important of the Chinese treaty ports, one of the five opened to foreign commerce in 1843, in the province of Kiang-su, near the junction of the Hwang-pu and the Wu-sung rivers, 12 miles from the mouth of the Yang-tse-kiang and 150 miles southeast of Nanking. Old Shanghai, or the Chinese city, is surrounded by a wall 24 feet high, pierced by six gates and enclosing an area of about two square miles. The streets are narrow and dirty and the buildings, low and crowded; modern sanitation and other improvements are being introduced gradually. The principal buildings are the Wei-Kwan, a commercial tribunal; a temple dedicated to the goddess of the seas; the Hall of Benevolence and other charitable institutions; a medical college, and the city prison. The foreign settlement is quite distinct in its boundaries, government and commerce. It stands on the left bank of the Hwang-pu, below the walled city from which it is separated by a moat, spanned by several bridges. Two creeks divide the settlement into three sections, the upper being the French concession; the central, the British, and the lower, the American. They are held at a low rental from the Chinese government under a code of regulations drawn up by the treaty powers.

The British section is the most valuable, and the consulates of all the other nations are situated there, except the French and American. A

municipal council is elected by the foreign renters of the English and American quarters, and another by the French, whose quarter is separately administered. The subjects and citizens of each nationality are under the protection of their respective consuls and amenable to the jurisdiction of their courts; or, where the person has no consul to appeal to, he is amenable to the Chinese authorities. Chinese in foreign employ are exempt from imperial jurisdiction. Great improvements have recently been carried out, new roads being made, larger and more substantial buildings erected, including fine villas, etc.

Along the bank of the Hwang-pu extends a wide "bund" or quay, with a bulwark of stone and numerous stone jetties, for landing and loading cargo; while the path forms a promenade for the residents from 50 to 80 feet wide. It extends for one mile in length and contains spacious houses surrounded with gardens; the lower stories being often used as stores (godowns) and counting-houses, the upper as residences.

The chief mission establishments in China are at Shanghai. That of the London Missionary Society has a printing office for publishing religious works in Chinese, from which was issued in one year 500,000 copies of the New Testament for gratuitous distribution, or at a small charge. Connected with the mission is a hospital for the gratuitous care of native patients, under the charge of a medical missionary, where many thousands attend during the year. The American Presbyterian Mission not only print in Chinese, but manufacture the metallic types. There is an extensive mission, also, under the auspices of the French *Société de la Propagation de la Foi*, where the missionaries conform to the dress and manners of the Chinese, with an extensive establishment near the walled city, having a cathedral within its precincts, capable of accommodating 3,000 people. Besides this the French have a handsome church in their concession. In the British concession there is an English church, with several chapels and meeting-houses scattered over the other parts of the settlement. Here also is a public library and a branch of the Royal Asiatic Society. Cotton spinning and shipbuilding are among the chief industries of Shanghai, and there are silk filatures, flour, rice and paper mills, furniture and piano works, packing-houses, ginning factories, etc.

The port of Shanghai extends from the upper limb of the Hwang-pu, below the native shipping, to Wu-sung, a distance of 12 miles, connected by rail, and of which the anchorage for foreign vessels extends for four miles below the settlement. The anchorage is divided into sections, defining the foreign from the Chinese boundary, where all the vessels are anchored abreast and lettered according to their position, steamers being separated from sailing ships. A foreign harbor-master is appointed by the Chinese authorities, who retain complete control over the conservancy of the harbor and its entrance and collect all shipping dues, duties on imports and exports, etc., through the foreign maritime customs. Shanghai has water communication with about a third of China and its trade has become very extensive, the port being connected with a system of steamship lines which carry cargo and passengers to and from all parts of the world. The largest trade is with Great Britain and her dependencies, but Japan, the United States, Germany and Russia are increasing their share. The gross value of foreign imports in 1914 was $166,774,094, the great bulk of which represented goods re-exported to other ports. The exports to foreign countries for the same year were valued at $103,236,774. The chief foreign imports are opium, cotton yarns and piece goods, metals, kerosene oil, coal and sugar; and the leading exports are raw silk and silk piece goods, tea, raw cotton, hides and native cloths. A considerable share of the coasting trade is in British hands, and both in the home and foreign trade steamers are chiefly employed. In 1914, 18,950,918 tons of foreign shipping entered and cleared the port, of which 40 per cent were British; besides this the native shipping entered and cleared amounted to 2,101,430 tons. Pop. 650,000; the foreign population is 13,436, of whom 4,465 are British, 3,361 Japanese, 941 American and 330 French.

SHANGHAI, a breed of fowls. See POULTRY.

SHANKLIN, William Arnold, American Methodist Episcopal clergyman and university president: b. Carrollton, Mo., 18 April 1862. He was graduated at Hamilton College in 1883, and took his S.T.B. at Garrett Biblical Institute in 1891. He was ordained in the Methodist Episcopal ministry in 1889, and held pastorates in Kansas, Washington, Iowa and Pennsylvania in 1887–1905. He was president of Upper Iowa University in 1905–09, and has since been president of the Wesleyan University.

SHANKS, William Franklin Gore, American journalist: b. Shelbyville, Ky., 20 April 1837; d. Hamilton, Bermuda, 22 Feb. 1905. He was a war correspondent for the New York *Herald* during the Civil War, afterward an editorial writer on that and other New York papers and was managing editor of *Harper's Weekly*, 1867–69. While city editor of the *Tribune* he was imprisoned for contempt of court for refusal to divulge the name of the writer of an article in the paper, taking the ground that he was a privileged witness. After his release he brought charges against District Attorney Winchester Britton, who was removed by Governor Dix. In 1880, he instituted suit, for the first time in the United States, against the vendor of a libel, recovering two judgments, and the Court of Appeals sustained the legal point at issue. In 1885 he organized the National Press Intelligence Company. He is the author of 'Personal Recollections of Distinguished Generals' (1865); 'A Noble Treason,' a tragedy (1876) and 'The Ring Master.'

SHANLY, Walter, Canadian railway engineer and legislator: b. Stradbally, Queen's County, Ireland, 11 Oct. 1819; d. 1901. He studied civil engineering and in 1837 emigrated to Canada. He was resident engineer of the Beauharnois and Welland canals in 1843–48; of the Northern New York Railroad in 1848–51; and chief engineer of the Ottawa and Prescott Railway in 1851–53. In 1853 he became chief engineer of the western division of the Grand Trunk Railroad and he was its general manager in 1857–62. In 1869–75 he was engaged in building the Hoosac Mountain Tunnel in Massachusetts, the greatest achievement of his career. He was chief engineer of the Canada Atlantic Railway in 1879–85, and thereafter was its consulting engineer. He was a member of the Canadian Assembly in 1863–67, and after the confederation served in the Dominion Parliament in 1867–72 and in 1885–90.

SHANNON, shăn'ŏn, **Wilson,** American politician: b. Belmont County, Ohio, 24 Feb. 1802; d. Lawrence, Kan., 30 Aug. 1877. He had a collegiate and law training and began practice at St. Clairsville, Ohio. In 1832 he became attorney for Belmont County, and in 1838 Democratic governor of the State. After the interim of one term he was re-elected in 1842. During 1844–45, until the suspension of diplomatic relations, he was Minister to Mexico by appointment of President Tyler; and after his return he practised law in Cincinnati. He was elected to Congress in 1852, where he served on the committee on foreign affairs. In 1855 he was appointed by President Pierce to succeed Andrew H. Reeder as governor of Kansas. The contests of the pro- and anti-slavery factions among the people to gain possession of the legislature made the post an exceedingly onerous one, especially for one who endeavored to administer affairs impartially. He resigned in August of the following year. After the political troubles of Kansas had subsided he returned to the State to reside.

SHANNON, a river in Ireland, the largest in the United Kingdom; rises at the foot of the Cuilcagh Mountains, in the northwest of County Cavan, flows west, southwest, through Lough Allen, then takes an irregular course, generally south, to Lough Rea, then southwest to Lough Derg, then south to Limerick where it becomes a tidal stream. From here on to its mouth are several expansions and it enters the ocean by a broad estuary. The various lakes through which it passes are in part real lake basins and partly river expansions. The total length is 254 miles. By means of improvements which cost about $5,000,000, the river has been made navigable from Lough Allen to Limerick, and the Grand and Royal canals, which connect the river with Dublin, have increased its commercial importance. Vessels of 1,000 tons ascend it as far as Limerick, and vessels of lighter draught as far as Athlone. Consult Harvey 'The Shannon and Its Lakes' (London 1896).

SHANNON, The. See CHESAPEAKE AND SHANNON, BATTLE OF.

SHARI, shä'rē, a large river in Central Africa, which enters the south side of Lake Tchad by several mouths after a course of about 700 miles from the southeast. It drains Central Sudan and in its lower course marks the boundary between Bagirmi and Cameroon. It is navigable to Gulfei. See TCHAD, LAKE.

SHARKS, an extensive group of elasmobranch fishes of the order *Selachii*, in which the claspers are complex in structure and the pectoral fins supported on the shoulder-girdle by three basal axial cartilages which may be more or less subdivided, and which bear the cartilaginous fin rays chiefly or exclusively on one side. The external parts of the fins are supported by delicate horn-fibres or actinotrichia. From the rays and skates the sharks are distinguished by the position of the branchial clefts, which are always lateral, by the fan-shaped pectoral fins, and by the shape of the body, which is almost always elongated, rounded and tapering to the strongly heterocercal tail.

The sharks breathe by gill-sacs or pouches, which open externally on the neck by gill-slits, of which there are five to seven pairs. Water may also be admitted to the gills through the spiracles, a pair of openings on the upper side of the head representing an anterior pair of gill-slits which are never large and often absent. The mouth exists on the under surface of the head, a conformation compelling some of these fishes to turn on their backs to bite conveniently objects at the surface. The skin is usually provided with small tooth-like granules in the form of placoid scales; and is used under the name of *shagreen*, in the manufacture of various articles, such as purses, spectacle-cases, or as a substitute for sandpaper. The eggs may be laid in capsules or cases of horny material, within which the embryos are protected, the egg-cases being moored or fastened by filaments to rocks or fixed objects, and the young form escaping in due time from its covering. The egg-cases of dog-fishes are frequently cast up on the shores, and receive the fanciful or popular name of "mermaids'-purses," "sea-purses," and the like. The majority of the sharks are, however, viviparous and in some the embryos are nourished by means of placenta-like structures. The skeleton never attains a high degree of perfection, but is chiefly cartilaginous. The skull exhibits no indications of divisions into distinct cranial bones, although the jaws are well developed and calcified. The intestine is provided with a spiral valve which serves to increase the area over which the food has to pass, and the base of the aorta contains rows of valves.

The species of sharks are numerous and so varied in structure that the living forms alone have been arranged in about 20 families. With the single exception of *Eulamia nicaraguensis*, which inhabits lake Nicaragua, all are marine, only a few occasionally entering the large rivers of India. Owing to their active, roving habits, most of them are widely distributed. With perhaps half a dozen exceptions all sharks are strictly carnivorous and predaceous, and because of their ferocity several of the large species are justly feared. A few of the most noteworthy species are the following:

Species of Sharks.— The white shark or man-eater (*Carcharodon carcharias*) is white below and brown on the upper parts. It is probably the best known of the sharks, and is found in most seas. (See MAN-EATER). The blue shark (*Carcharinus glaucus*), also known as man-eater, is slaty-blue on the upper, and white on the under parts. It may attain a length of 20 feet or more, and is exceedingly destructive to shoals of food-fishes, pursuing its prey even into the fishermen's nets. Both of these occur occasionally on our coasts, where the dusky shark (*C. obscurus*) closely related to the last, but smaller, is very common. The thresher shark (*Alopias vulpes*), is known by the exceedingly elongated upper tail-lobe, which the fish uses after the fashion of a powerful flail when it attacks a school of fish. It feeds chiefly on fishes, and occasionally visits our coasts. The average length varies from 12 to 15 feet. A very common small species along the Atlantic Coast is the sand shark (*Carcharias littoralis*), which has very acute teeth mostly provided at the base with one or two cusps. The

hammer-headed shark (q.v.) is at once recognized by the lateral elongation of the head to form a hammer-like structure. The porbeagle shark (*Lamna cornubica*) may attain a length of six feet, and is grayish-black. It has slender, very acute teeth and is quite a common visitor to our coasts, where it is also known as the mackerel-shark. The basking-shark (*Cetorhinus maximus*) attains a length of from 30 to 36 feet, being the largest of all sharks, and is found around our coasts but is chiefly an Arctic species. The name is derived from its habit of lying motionless on the surface of the water in the sun, often in schools. It is sluggish and, in spite of its huge size, harmless and feeds on fish. The head and teeth are small, the dorsal fin very large and the gill-slits long. The Greenland, northern, or sleeper shark (*Somniosus microcephalus*) attains a length of 18 feet, and is brown, shaded with deep blue. It feeds upon the carcasses of whales, even attacks living whales, and is chiefly found in the Arctic seas. The spinous shark (*Echinorhinus spinosus*) is so named from the presence of the spiny scales scattered over its integument. The average length is seven or eight feet. It is common on the Atlantic coasts of Europe and Africa, and has been taken once on Cape Cod.

Of the dog-fishes (q.v.) may be mentioned the smooth dog (*Galeus canis*), and the picked dog-fish (*Squalus acanthias*). Two very remarkable sharks representing groups now nearly extinct are the Port Jackson shark (see CESTRACION) and the frilled shark (*Chlamydoselache anguineus*). The former is remarkable for the pavement-like teeth and stout fin-spines and the latter for its eel-shaped body, diphycercal tail, frilled gill-clefts and prominently lobed teeth. The former occurs in Australian, the latter in Japanese waters. Another very recent discovery in the latter region is *Mitsukurina owstoni*, unique among living sharks in its prolonged snout and protruding mouth. The sawsharks (*Pristiophoridæ*), which bear a doubly serrate process on the snout like the sawfishes (q.v.), are otherwise shark-like; and the angel-sharks (*Squatinidæ*), with much flattened bodies, lead to the skates and rays.

The varieties of extinct sharks are still more numerous and vary from the delicate little acanthodians, only a few inches long, of the Carboniferous, to the huge Tertiary carcharodons, whose five-inch teeth indicate a length of 75 feet. Many of the Palæozoic sharks were of types very different from any now living.

Usefulness.— The liver of some sharks contains a large quantity of oil, and they are accordingly caught in great numbers in some places, and the oil extracted. Shark-fishing constitutes an industry of some importance on the coast of Russian Lapland and the northern portion of Norway. Those caught here are chiefly the basking shark and the Greenland shark. The Norwegians employ decked vessels of 20 to 30 tons burden, which carry on the fishery as much as 100 or 150 miles from land, at depths of 250 to 300 fathoms. These vessels carry five or six men. On the coast of Norway, farther to the south, other species of sharks are also caught. In order to attract the sharks the fishermen take an old barrel pierced with several holes, pour oil or grease into it and sink it to the bottom with stones. The oil or grease escapes slowly, and is carried by the currents to a distance, thus attracting the keen-scented fishes to the place where the boat is stationed. Here they are caught by hooks baited with salted seal's flesh and fastened to the end of strong chains. When a shark is hooked three of the men haul in the chain, while a fourth stands ready with a mallet, weighing about 20 pounds, to stun the fish when its head appears.

The fisheries of China, India and Africa, which have for their object the white shark and other large species for the purpose of supplying the sharks-fin trade of China, are also of great value, and capture annually a total of not less than 100,000 sharks. In the United States shark fisheries have never been developed extensively, practically the only one worthy of mention being the dogfish industry of New England and particularly of Maine, where the livers of the spiny or picked dogfish are tried for oil and the flesh ground into a poultry food. Dogfish oil is used by curriers and as an adulterant of cod-liver oil. In Europe the dogfish fisheries are far more extensive and, besides the oil secured from the livers, the flesh yields an extract which for nutritive properties compares favorably with extract of beef, and is generally edible and likable.

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SHARON, Shār'ŏn, Pa., borough in Mercer County, on the Shenango River and on the Pennsylvania, the Erie and the Lake Shore and Michigan Southern railroads, about 40 miles south-southwest of Meadville and near the Ohio boundary. It is in a coal-mining and iron ore region, and its chief industries are connected with the mining and shipping of coal and of iron and steel products. The principal industrial establishments are furnaces, rolling mills, foundries, nail factories, machine shops, tile and brick works, boiler works, a brewery, a planing mill and a furniture factory. There are also manufactured a large amount of brass and steel products, explosives, spokes, stoves and lumber products. The stone quarries, in the vicinity, furnish employment to a number and contribute to the prosperity of Sharon. The principal public buildings are the business blocks, churches and schools. The educational institutions are Hall Institute (Baptist), founded in 1888, Saint Scholastica Academy (Roman Catholic), a high school, public schools, parish schools, a public school library, founded in 1877 and several private schools. Pop. (1920) 21,747.

SHARON, Palestine, in biblical geography a plain on the Mediterranean coast of the country, reaching inland to the hills and from Joppa to Cæsarea. It was originally of great fertility, with forests and rich vegetation, and is still excellent pasture ground. The beauty of the district was generally recognized (Isaiah xxxv, 2), and its roses in the Song of Solomon (ii, 1). The herds of David are mentioned as grazing there (1 Chron. xxvii, 29).

SHARON SPRINGS, N. Y., village in Schoharie County, on the Delaware and Hudson Railroad, about 50 miles west by north of Albany. It is in a valley about 1,100 feet above the sea. It is a famous summer resort on account of its picturesque location and its four noted mineral springs, a white sulphur, blue sulphur, a magnesia and a chalybeate. It was incorporated in 1871. Pop. about 800; in the summer season, about 10,000.

SHARP, Abraham, English mathematician: b. Little Horton, 1651; d. Yorkshire, 15 July 1742. Having studied and taught mathematics in Liverpool, he was employed by John Flamsteed in the Greenwich Observatory and made for him, in 1688–89, Flamsteed's first successful instrument, a mural arc. Afterward he taught mathematics in London and subsequently retired to Ltttle Horton, where he devoted himself to mathematics and to making astronomical and calculation instruments, and is said to have been the first Englishman to make these accurately. He published a book of logarithms, the first of its kind, was a joint author with Crosthwait of 'The British Catalogue' and plotted a number of important astronomical maps. Consult Cudworth, W., 'Life and Correspondence of Abraham Sharp' (Bradford 1889).

SHARP, Becky, the leading character in Thackeray's novel, 'Vanity Fair' (1847). In the notes contributed by Thackeray's daughter, Mrs. Ritchie, to the 'Biographical Edition' of Thackeray's works, she makes the statement that she once saw the lady who was supposed to have unconsciously sat for the portrait of Rebecca Sharp. Literary gossip contains a story, current for a time, that Becky was the portrait of Charlotte Brontë and that Miss Brontë retaliated by drawing Thackeray as Rochester in 'Jane Eyre.' The character has been incorporated into a drama by J. M. Barrie in 1893; by Langdon Mitchell and by Robert Hitchens and Cosmo Gordon Lennox in 1901.

SHARP, Dallas Lore, American author and educator: b. Haleyville, N. J., 13 Dec. 1870. He was graduated at Brown University in 1895 and at the Boston University School of Theology in 1899. He was ordained in the Methodist Episcopal ministry in 1895 and held pastorates in Massachusetts in 1896–99. He has been associated with the faculty of the Boston University since 1899 and since 1909 has been professor of English there. He was associate editor of the *Youth's Companion* in 1902–03. Author of 'Wild Life Near Home' (1901); 'The Lay of the Land' (1908); 'The Face of the Fields' (1911); 'Where Rolls the Oregon' (1914); 'The Hills of Hingham' (1916), etc.

SHARP, Granville, English abolitionist: b. Durham, 10 Nov. 1735; d. London, 6 July 1813. He studied law, but abandoned it to accept a place in the ordnance office. He was the patron of the slave Somerset, whom he found in the streets of London in 1769, having been turned away by his master because of illness. Sharp placed him in a hospital, and on his recovery procured employment for him. Two years later Somerset was claimed by his master, arrested and imprisoned, whereupon Sharp summoned them both before the lord mayor, who discharged the slave. The master still refusing to release him, Sharp brought the case before the court of the King's Bench, which resulted in the famous decision against the legality of slavery in England in 1772. In 1777 he resigned from the ordnance office because of his disapproval of the American War, and devoted himself thereafter to philanthropy, particularly to the overthrow of slavery. He was chairman of the meeting which in 1787 formed the Association for the Abolition of Slavery and was one of the founders of the Negro colony at Sierra Leone. He was also an advocate of parliamentary reform, opposed dueling and favored the extension of privileges to Ireland. He wrote 61 pamphlets in reference to the causes to which he devoted his life, among which are 'Representation of the Dangerous Tendency of Tolerating Slavery in England (1772); 'Treatise on Duelling'; 'Account of the English Polity of Congregational Courts' (1786), etc. His biography was written by Prince Hoare (London 1820) and by Charles Stuart (1836).

SHARP, James, Scottish ecclesiastic: b. Castle of Banff, 4 May 1613; d. Magus Muir, Saint Andrews, 3 May 1679. He was educated at the University of Aberdeen and was appointed regent there, where his conduct won him the friendship of the clergy. He held a professorship in Saint Leonard's College, Saint Andrews, and was then appointed Minister at Crail, Fifeshire. In 1656 he was a representative from the Presbytery to Cromwell, and he managed this mission so well that he was sent in 1660 to Monk and to Charles II. He treacherously agreed to help Monk restore Episcopacy in Scotland, but the time for this coup not being ripe he played the double part of friend to his constituents and tool of Monk. When Parliament established Episcopacy in 1661 Sharp benefited from both parties, being appointed professor of theology in Saint Mary's College, Saint Andrews and king's chaplain for Scotland. He now completely went over to the king's party, was consecrated archbishop of Saint Andrews and primate of Scotland. In 1663 he secured the establishment of a high court commission, in which he took precedence of the chancellor, and the odious persecutions of the Resolutioners by this court, especially the cruelties it inflicted after the uprising in Pentland, made Sharp an object of intense hatred throughout the country, a hatred shared by the king and court, whose tool he was regarded. Falling by accident into the hands of a party of his enemies in 1679, he was dragged from the coach in which he was riding with his daughter and was beaten to death. Consult Dodds, James, 'Fifty Years' Struggle of the Scottish Covenant' (London 1860); Stephen, Thomas, 'Life and Times of Archbishop Sharp' (ib. 1839); 'The Lauderdale Papers' (Camden Society Publications, ib. 1885).

SHARP, William, Scottish writer: b. Paisley, 12 Sept. 1856; d. Sicily, 13 Dec. 1905. He was educated at the University of Glasgow, after which he made a voyage to Australia. In 1879 he settled in London, where he knew Philip Bourke Marston and Dante Gabriel Rossetti, whose lives he later wrote. He was a

critic of art and literature and an industrious editor. In the latter capacity he projected the 'Canterbury Poets' and the 'Sonnets of the Century.' His early life in the west highlands of Scotland probably confirmed his taste for Celtic literature and among his works is a collection made with the assistance of his wife called 'Lyra Celtica.' In verse he published 'The Human Inheritance' (1882); 'Earth's Voices' (1884); 'Romantic Ballads and Poems of Fantasy' (1886); 'Sospiri di Roma' (1891); 'Flower o' the Vine' (1894); 'Sospiri d'Italia' (1904). His fiction includes 'Children of Tomorrow' (1890); 'Madge o' the Pool'; 'Wives in Exile' (1898); 'Silence Farm' (1899). He wrote, also, the biographies of Shelley, Heine and Browning and 'Literary Essays'; 'Greek Studies' (1903–04). Two volumes of his critical work appeared in 1912 and in 1909–11 appeared a complete edition of his works (7 vols.). Consult the 'Memoir' by his wife, Elizabeth A. Sharp (2 vols., London 1912). See MACLEOD, FIONA.

SHARP-SHIN, a small hen-hawk (q.v.).

SHARP-SHOOTERS, the name formerly given to the best shots of a company, who were armed with rifles and took aim in firing. They are superseded by the better arms and more complete organization of modern armies. According to the United States army regulations, a sharpshooter is a grade of rifleman next below that of expert rifleman. He wears a silver badge, consisting of a pin and cross, on the left breast of the coat. Consult 'Small Arms Firing Manual, United States Army.'

SHARP-TAILED GROUSE, the northern prairie-chicken (q.v.), a grouse (*Pediœcetes phasianellus*), which has the general habits of the pinnated grouse, but differs among other features in lacking the neck-tufts, in the characteristic form of the tail, in which the central pair of quills are soft, parallel-edged and square-tipped, projecting an inch or two beyond the next pair. It is somewhat more fond of brushy places and flies more than does the pinnated grouse, which is steadily encroaching on its northwestern habitat.

SHARPE, Samuel, English Egyptologist, Bible translator and banker: b. London, 8 March 1799; d. there, 28 July 1881. He entered the banking business of his uncles in 1814, became a partner in 1824 and continued in business successfully until his retirement in 1861. He was deeply interested in archæological research and published many works on Egyptology, as well as making translations of the Bible which were characterized by a nice discrimination. Author of 'The Early History of Egypt' (1836); 'Egyptian Inscriptions' (1837); 'Vocabulary of Egyptian Hieroglyphics' (1837); 'The History of Egypt Under the Ptolomies' (1838); 'The New Testament Translated' (1840); 'The History of Egypt from the Earliest Times till A.D. 640' (1846); 'The Hebrew Scriptures Translated' (1865); 'A Short Hebrew Grammar Without Points' (1877); 'Inquiry into the Age of the Moabite Stone' (1879), etc.

SHARPLES, shär'p'lz, **Stephen Paschall,** American chemist: b. West Chester, Pa., 21 April 1842. He was graduated at Harvard in 1866, and in 1875–93 was professor of chemistry at the Boston Dental College. He has been a consulting chemist since 1872, and in 1885–1902 he was inspector and assayer of liquors for Massachusetts. He is the editor of the *Genealogical Magazine.* Author of 'Chemical Tables' (1866).

SHARPLESS, Isaac, American educator: b. Chester County, Pa., 16 Dec. 1848; d. 16 Jan. 1920. He was graduated from the Lawrence Scientific School, Harvard, in 1873, was instructor in mathematics at Haverford College in 1875–79, occupied the chair of mathematics and astronomy there in 1879–85, was dean in 1885–87 after which he was president of the college. He wrote textbooks of astronomy and geometry and also published 'English Education' (in International Education Series, 1892); 'A Quaker Experiment in Government' (1898); 'Two Centuries of Pennsylvania History' (1900); 'The American College' (1915), etc. He received honorary degrees as follows: Sc.D. from University of Pennsylvania, L. H. D. from Hobart College, LL.D. from Swarthmore College and from Harvard University. He was a member of the council of the Historical Society of Pennsylvania.

SHARPLESS, James, American artist: b. England, 1751; d. New York, 26 Feb. 1811. He began his artistic career in the United States in 1794 with a series of pastel portraits for which some of the most eminent men of the day gave him sittings, and there are still extant by him portraits of Washington, Jefferson, Hamilton, Monroe, De Witt Clinton, Burr, etc. These are treasured in the National Museum at Philadelphia, where they were placed, 40 in all, in 1876. He was also interested in mechanics and in the first volume of the 'Medical and Philosophical Register' (1811) is a paper by him on steam-carriages. He is buried in the churchyard of Saint Peter's, Barclay street, New York.

SHARPS, Christian, American inventor: b. New Jersey, 1811; d. Vernon, Conn., 13 March 1874. He developed a taste for mechanics at an early age and practically devoted his life to invention. He was the originator of many ingenious implements, but none of these gave him such fame and remuneration as the breech-loading rifle which bears his name. In 1854 he removed to Hartford, Conn., to superintend the manufacture of this rifle, and he subsequently invented other firearms of great value and patented many ingenious implements of various kinds.

SHARPSBURG, Md., a village in Washington County, beautifully situated in a narrow valley, 12 miles south of Hagerstown, about the same distance north of Harper's Ferry and three miles east of Shepherdstown, on the Potomac. It has no manufactures, but is surrounded by a fine farming country, the chief products of which are corn, wheat, hay, apples, peaches and other fruits. It is chiefly noted as the scene of the battle of Antietam (q.v.) or Sharpsburg, fought on the outskirts of the village, 17 Sept. 1862, in which more men were killed and wounded than on any other day of the Civil War. Pop. 1,100.

SHARPSBURG, Pa., borough in Allegheny County, on the Allegheny River and on the Pittsburgh and Cincinnati, Chicago and Saint Louis and the Pennsylvania railroads, six miles northeast of Pittsburgh. It is in a coal-mining region. The chief industrial establishments are foundries, blast furnaces, rolling mills, machine shops, bottle works, planing mills, hair, felt and lubricating oil works, wire and brick works. Other manufactures are oil cans, varnish and japan, chemicals, coal-mining tools and oil-well machinery. It has large coal yards and exports annually a large amount of coal and of steel and iron products. It has a high school, public and parish elementary schools and a public library. Pop. 8,921.

SHARPSBURG (Md.), **Battle of.** See ANTIETAM, BATTLE OF.

SHARPSHOOTER, popular name in southern United States for any of several hemipterous insects which puncture the immature cotton bolls, causing them to wilt or rot. Of these the *Homalodisca coagulata* is the most common. The Mexican boll-weevil is likewise known by the name in some parts of Texas.

SHARSWOOD, shärz'wŭd, **George,** American jurist: b. Philadelphia, Pa., 7 July 1810; d. there, 28 May 1883. He was graduated at the University of Pennsylvania in 1828 and was admitted to the bar in 1831. He served in the State legislature in 1837–38 and in 1842–43, and in 1845 was appointed judge of the District Court of Philadelphia, becoming president of that court in 1848. In 1848 he was appointed to the bench of the Supreme Court of Pennsylvania, of which he was chief justice from 1878 until he retired in 1882. He ranked as one of the most eminent jurists in the State. He was professor of law at the University of Pennsylvania in 1850–67. He brought out editions of many English law textbooks, of which the most famous was 'Sharswood's Blackstone's Commentaries' (1859). He was author of 'Professional Ethics' (1854); 'Popular Lectures on Common Law' (1856); 'Lectures on Commercial Law' (1859), etc.

SHASTA, Mount, a peak of the Sierra Nevada range in Siskiyou County in California. It is of volcanic origin, about 14,350 feet above sea-level, and on its summit are three glaciers, one of which, Whitney, is three miles long. On the slope and near the base are large trees, some 300 feet high. The mountain is conical in form and has been a dormant volcano for a long period. Consult Muir, 'The Mountains of California' (New York 1911).

SHASTA (shăs'tą) **INDIANS,** probably from *tsasdi,* "three," referring to a triple-peak mountain. A group of small tribes forming the Sastean linguistic stock of American Indians, formerly occupying the territory drained by Klamath River and its tributaries from the western base of the Cascade range to the point where the Klamath flows through a ridge of hills east of Happy Camp, in northern California and extending over the Siskiyou Mountains in Oregon as far as the confluence of Stewart and Rogue Rivers. They consisted of two divisions, marked by slightly divergent dialects, one comprising the Iruwaitsu, Kammatwa and Kikatsik; the other the Chimelakwe and Katiru. They have practically lost their native customs through contact with civilization, but they were a sedentary people, living in rectangular, semi-subterranean plank houses, and subsisting chiefly on salmon and other fish, acorns, roots and seeds. They made basket caps (which the women wore), as well as small food baskets and a rude form of dug-out canoe. They rapidly succumbed to the encroachments of civilization, and while the tribes composing the stock were never populous, their total number at present is about 1,500, most of whom are on the Siletz Reservation in Oregon. Mount Shasta derives its name from these Indians. Consult Dixon, R. B., 'The Shasta' (in American Museum of Natural History *Bulletin,* Vol. XVII, New York 1907).

SHATTUCK, shăt'ŭk, **Frederick Cheever,** American physician, brother of G. B. Shattuck (q.v.): b. Boston, Mass., 1 Nov. 1847. He was graduated at Harvard University in 1868 and took his M.D. there in 1873. He engaged in practice in Boston in 1875, was connected with the faculty at Harvard from 1879, and from 1888 he was Jackson professor of clinical medicine there. He became professor emeritus in 1912, at the same time retiring from practice. He has been an overseer of Harvard since 1913 and is a retired lieutenant in the United States Army Medical Reserve Corps. Author of many papers in medical journals.

SHATTUCK, George Brune, American physician and editor: b. Boston, Mass., 18 Aug. 1844. He was graduated at Harvard in 1863 and took his M.D. there in 1869. He was engaged in practice in Boston in 1869–1911, when he retired. He edited the Boston *Medical and Surgical Journal* in 1881–1911. At the time of his retirement he was senior physician to the Boston City Hospital. He was an overseer of Harvard in 1890–1901 and in 1903–12.

SHATTUCK SCHOOL, The, a noted college preparatory shool at Faribault, Minn., organized in 1865 and controlled by the Protestant Episcopal Church. The corporate name of the Shattuck School and the Seabury Divinity School, which is also at Faribault, is the "Bishop Seabury Mission." The school has 19 instructors and 250 students. The school course is divided into five forms of one year each, and the establishment is managed on the house system. Military drill is obligatory, and there is a cadet corps with four companies, and an artillery platoon with two detachments. The principal buildings connected with the school are the chapel, Shumway, Morgan, Smyser, Whipple and S. S. Johnson halls. The school was named in honor of one of its earliest benefactors, Dr. George Shattuck, the founder of Saint Paul's School, Concord, N. H., and its head master from 1867 has been the Rev. James Dobbin. Since its organization the school has graduated over 2,000 students. Consult Adams, 'Some Famous American Schools' (1903).

SHAUGHNESSY, shä'nĕ-sĭ, **Thomas George,** 1ST BARON OF MONTREAL, Canadian railway president: b. Milwaukee, Wis., 6 Oct. 1853. In 1868–82 he was connected with the Milwaukee and Saint Paul and the Chicago, Milwaukee and Saint Paul railroads, in which time he gained a mastery of railroad management. He became purchasing agent of the Canadian Pacific Railway in 1882, later was assistant general manager and is now president of the Canadian Pacific Railway and all its associated companies. He accomplished an important share in the development of Canada and his services were recognized by a knight-

hood in 1901, while in 1916 he was created Baron Shaughnessy of Montreal.

SHAW, shâ, **Albert,** American editor and political economist: b. Shandon, Butler County, Ohio, 23 July 1857. He was graduated from Iowa College, Grinnell, Iowa, in 1879, took a post-graduate course in constitutional history and economic science there, and in 1881 began a course in history and political science at Johns Hopkins, taking the degree of Ph.D. in 1884. In 1883–88 and again in 1889–90 he was on the editorial staff of the Minneapolis *Tribune,* in 1888–89 he studied in Europe and in 1891 established the *American Review of Reviews,* which he has since edited. In 1884 he published 'Icaria, a Chapter in the History of Communism,' which was translated into German. His other works include 'Co-operation in the Northwest' (1888); 'Local Government in Illinois' (1883); 'Municipal Government in Great Britain' (1895), and 'Municipal Government in Europe' (1895). The last two mentioned gave him a recognized standing as an authority on questions of municipal government, and he has since written many magazine articles on economic, especially municipal, subjects. Other works are 'The Business Career in its Public Relations' (1905); 'Political Problems of American Development' (1907); 'The Outlook of the Average Man' (1907); 'Cartoon History of Roosevelt's Career' (1910).

SHAW, Anna Howard, American woman suffrage leader, minister and physician: b. Newcastle-on-Tyne, England, 14 Feb. 1847; d. Moylan, Pa., 2 July 1919. She came to the United States at the age of four, studied at Albion College, Michigan in 1872–75, was graduated at the Boston University of Theology in 1878 and took her M.D. at Boston University in 1885. She was granted a local preacher's license by the district conference of the Methodist Episcopal Church, and paid the expenses of her education by preaching and lecturing. She was pastor of the Methodist Episcopal Church at Hingham, Mass., in 1878, and at East Dennis in 1878–85. She was, however, refused ordination by the New England Conference because of her sex, and the decision was confirmed by the General Conference at Cincinnati in 1880. She was ordained in the Protestant Methodist Church 12 Oct. 1880, the first woman ordained by that denomination. In 1885 she resigned her pulpit to lecture for the Massachusetts Woman Suffrage Association. She was national superintendent of franchise for the Women's Christian Temperance Union in 1886–92; and in her connection with the National American Woman Suffrage Association she was national lecturer in 1886–1904; vice-president-at-large in 1892–1904; president in 1904–15; and thereafter was honorary president. To her courage, initiative, resourcefulness and sound reasoning may be credited much of the success of the woman suffrage movement, the constitutional amendment for which was passed by Congress shortly before her death. She was in her lifetime the recipient of world-wide honors, had spoken in every State in the Union, before most of the State legislatures, before the committees of both houses of Congress; as well as being the first woman to speak in Gustav Vasa Cathedral, the State Church of Sweden, and the first ordained woman to preach at the universities of Copenhagen, Berlin, Christiania, London and Amsterdam. She was chairman of the Woman's Committee of the Council of National Defense from 1917, and received the distinguished service cross for her services in the European War.

SHAW, Byam, English artist: b. Madras, India, 13 Nov. 1872. In 1878 he went with his family to England, and received his art education at the Saint John's Wood School of Art and the Royal Academy Art Schools (1890–92). In 1892 he began work as an illustrator, and gradually attained success in this line, first painting 'Rose Marie,' being exhibited in 1893. His work was received with favor by art critics and became immediately popular as well. It is marked by individuality, fertility of imagination and brilliant coloring. His other pictures include 'Silent Moon' (1894); 'Whither?' (1896); 'Love's Baubles' (1897); 'Truth' (1898); 'Love the Conqueror'; 'A Woman's Protest'; 'The Lady of Shalott.' Among the works he has illustrated are 'Browning's Poems' (1898); 'Tales from Boccaccio' (1899); 'Chiswick Shakespeare' (1900); 'Old King Cole's Book of Nursery Rhymes' (1901); 'Coronation Book' (1902); 'Pilgrim's Progress' (1904); 'The Cloister and the Hearth' (1909); Poe's 'Tales' (1909).

SHAW, George Bernard, Irish dramatist and critic: b. Dublin, 26 July 1856. He went to London in 1876, engaged in socialistic agitation, and in 1884 became one of the founders of the Fabian Society. To the volume of 'Fabian Essays in Socialism' (1889) he contributed 'The Basis of Socialism' and 'The Transition to Social Democracy.' During 1886–94 he wrote musical and art criticisms for the *World, Truth* and the *Star.* In 1895–96 he contributed dramatic criticism to the *Saturday Review,* and arrested attention by the vigor and severity of his judgments. In 1892 his first play, 'Widower's Houses,' was produced at the Independent Theatre, and was published as Volume I of the Independent Theatre series of plays. Between 1880 and 1883 he published several novels, such as 'The Irrational Knot'; 'Love Among the Artists'; 'Cashel Byron's Profession' and 'An Unsocial Socialist.' Two volumes of interpretative studies, 'The Perfect Wagnerite' and 'The Quintessence of Ibsen,' deal with the works of Wagner and Ibsen, the former especially concerning itself with Wagner's chief work, 'The Ring of the Nibelungs.' In 1898 he published two volumes of 'Plays Pleasant and Unpleasant,' containing the 'Widower's Houses'; 'The Philanderer' and 'Mrs. Warren's Profession'; 'You Never Can Tell'; 'Arms and the Man'; 'Candida' and 'The Man of Destiny.' In 1900 appeared 'Three Plays for Puritans'; followed by 'The Admirable Bashville' (1901); 'Man and Superman' (1903); 'John Bull's Other Island' (1904); 'How He Lied to Her Husband' (1904); 'Major Barbara' (1905); 'The Doctor's Dilemma' (1906); 'Getting Married' (1908); 'The Showing-up of Blanco Posent' (1909); 'Press Cuttings' (1909); 'The Dark Lady of the Sonnets' (1910); 'Misalliance' (1910); 'Fanny's First Play' (1911); 'Androcles and the Lion'; 'Pygmalion'; and 'Overruled' (1912); 'Great Catherine' (1913); 'The Music-Cure' (1914); 'O'Flaherty, V. C.'; 'The Inca of Persalem' (1915); 'Augustus does His Bit' (1910); 'Heartbreak House' (1917). Other works include 'The Sanity of Art' (1895); 'The Common Sense of Municipal Trading' (1904); 'Socialism and Superior Brains' (1910); 'Common Sense about the War' (1914); besides numerous contributions to syndicate journalism. He is fearless, vigorous and witty, a master of irony, unhampered by the traditions either of the theatre or of literature, his style having that ephemeral brilliance without permanent quality which pleases the passing popular fancy. As a dramatist he is resourceful in effective situations; but his plays appeal to a limited public. (See CANDIDA; MAN AND SUPERMAN). Consult his preface, 'Mainly About Myself,' to Volume I of 'Plays Pleasant and Unpleasant' for statement of his point of view; Burton, R., 'Bernard Shaw; The Man and the Mask' (1916).

SHAW, Henry Wheeler, «JOSH BILLINGS,» American humorist: b. Lanesborough, Mass., 21 April 1818; d. Monterey, Cal., 14 Oct. 1885. He entered Hamilton College in 1832, but remained only one year. He then went to the West to pursue a number of occupations offered by the primitive frontier life, but returned to the East in 1858, and became an auctioneer at Poughkeepsie. He contributed humerous articles to a local paper under the signature of "Josh Billings," but his writings failed to attract much attention until he employed a style of phonetic spelling resembling his homely method of pronunciation. His first book, 'Sayings of "Josh Billings"' 1866, had an enormous success. For many years he contributed to the *New York Weekly.* His most successful literary venture was a travesty on the 'Old Farmer's Almanac,' published for many years by the Thomas family, '"Josh Billings Farmers' Allminax."; Over 200,000 copies were sold within two years of its appearance in 1870. In 1863 he began to give public lectures, which consisted of detached bits of homely philosophy, usually pointing a moral. The delivery having an inimitable strain of drollery made him a great popular success. He published 'Every Boddy's Friend' (1876); 'Josh Billings' Complete Works' (1876); 'Josh Billings' Trump Kards' (1877); 'Josh Billings' Spice-Box' (1881). Consult the 'Life' by F. S. Smith (New York 1883).

SHAW, John, American naval officer: b. Mount Mellick, Queen's County, Ireland, 1773; d. Philadelphia, Pa., 17 Sept. 1823. After serving on American merchant ships he commanded the schooner *Enterprise* of the United States navy, and in December 1799 started on an eight months' cruise, during which he engaged in five actions with the French, recapturing 11 American prizes and taking five French privateers. In one hour's combat he forced the *Flambeau,* a French vessel of 100 men and 14 guns, to surrender after half of her men were killed or crippled, while the *Enterprise* had sustained a loss of but 10. Shaw was raised to the rank of captain; in 1811 he directed the defenses of New Orleans, La., and in 1813 commanded the naval force which recaptured Mobile, Ala.; in 1814 while in charge of a squadron he was blockaded by the enemy in the Thames River between New London and Norwich, Conn., subsequently seeing other service both at home and abroad.

SHAW, John Balcom, American Presbyterian clergyman, educator and author; b. Bellport, N. Y., 12 May 1860. He was graduated at Lafayette College in 1885, at the Union Theological Seminary in 1888 and was ordained in that year. He held pastorates in New York, Chicago and Los Angeles in 1888–1915, and has since been president of the Elmira College for Women. Author of 'Four Great Questions' (1898); 'The Difficult Life' (1903); 'Vision and Service' (1907); 'The Angel in the Sun' (1914), etc.

SHAW, John William, American Catholic archbishop: b. Mobile, Ala., 12 Dec. 1863. He was educated at the academy of the Brothers of the Sacred Heart, Mobile, at Saint Finian's Seminary, Navan, Ireland, the University of the Propaganda and the North American College, Rome. He was ordained to the Roman Catholic priesthood on 26 May 1888. In 1888–89 Father Shaw was assistant at the cathedral of Mobile; in 1889–91 assistant and missionary at Saint Peter's Church, Montgomery, Ala., and in 1891–1910 was rector of the cathedral at Mobile and chancellor of the diocese. On 7 Feb. 1910 he was appointed coadjutor bishop of San Antonio, Tex., succeeding to the see, 11 March 1911. On 25 Jan. 1918 he was appointed archbishop of New Orleans.

SHAW, Lemuel, American jurist: b. Barnstable, Mass., 9 Jan. 1781; d. Boston, Mass., 30 March 1861. He was graduated at Harvard University in 1800 and became prominent in the practice of law in Boston. He sat in the Massachusetts house of representatives and senate, 1811–16 and in 1819, and in the State senate 1821–22 and 1828–29, and was a member of the State Constitutional Convention of 1820. As chief justice of the Massachusetts Supreme Court, 1830–60, he won a high reputation as a jurist. His publications include addresses and orations. He was a Fellow of the American Academy of Arts and Sciences; a member of the Massachusetts and New England Historical Societies and of various local clubs, and a trustee of the Boston Library and Humane societies. He translated from the French the 'Civil and Military Transactions of Bonaparte. His judicial decisions comprise nearly 50 volumes.

SHAW, Leslie Mortier, American lawyer and politician: b. Morristown, Vt., 2 Nov. 1848. He was graduated from Cornell College, Mount Vernon, Iowa, in 1874, and from the Iowa College of Law in 1876; was admitted to the bar and established a law practice in Denison, Iowa. He was also prominent in local financial circles, and became president of the bank of Denison, and of the bank of Manilla, Iowa. He occasionally took part in the campaign work of the Republican party, but did not become prominent until the campaign of 1896, when his strong advocacy of the gold standard, his skilful handling of statistics and keen arguments in public speaking won him a wide reputation, and he was called upon to speak in many different sections of the country. His effective work on the Republican side in the free silver campaign of 1896, speaking an average of five hours a day some weeks and as high as seven hours for several consecutive days, led to his

nomination and election the following year as governor of Iowa. He was re-elected two years later, doubling his plurality and multiplying his majority by four. He declined a third nomination. In 1898 he was president of the International Monetary Congress at Indianapolis. At the end of his second term as governor he became Secretary of the Treasury in President Roosevelt's Cabinet and held that position a little over five years — the longest term in that office since 1841. He resigned in 1902 and was engaged in banking in New York and Philadelphia until 1913 when he retired. Since then he has lectured occasionally, and frequently engaged in joint debates on both economic and social questions. He has divided his residence between New York City and San Diego, Cal.

SHAW, Richard Norman, English architect: b. Edinburgh, 7 May 1831; d. 1912. He was educated at Edinburgh where he practised as an architect, being chiefly engaged in the erection of dwelling-houses. He published 'Sketches from the Continent' (1858); and (with T. G. Jackson) 'Architecture, a Profession or an Art' (1891). He was very successful in planning substantial houses of a plain yet elegant elevation, and to his brick structures of this sort he has imparted a certain dignity and charm which lends to them the personal stamp of good taste a host of followers have imitated, but rarely attained. In 1872 he was made associate, and in 1877 member, of the Royal Academy. He retired in 1901.

SHAW, Robert Gould, American soldier: b. Boston, Mass., 10 Oct. 1837; d. Fort Wagner, Charleston Harbor, S. C., 18 July 1863. He studied at Harvard, entered a New York counting-room, enlisted in the 7th New York regiment at the outbreak of the Civil War, and was promoted captain (1862). In 1863 he was made colonel of the 54th Massachusetts, the first negro regiment sent from the free States. The regiment left Boston for the front 28 May, acquitted itself satisfactorily in a skirmish on James' Island, near Charleston, S. C., 16 July, and on 18 July participated with distinction in the desperate attack on Fort Wagner (q.v.). Shaw was killed while leading his troops. The well-known Shaw memorial by Saint Gaudens was placed in 1897 on Boston Common. Boston has also a bust of this brave officer by Edmonia Lewis. Consult Higginson, 'Harvard Memorial Biographies' (Vol. II, Boston 1866); and Teamoh, R. T., 'Sketch of the Life and Death of R. G. Shaw' (Boston 1904).

SHAW, Sir William Napier, English physicist: b. 4 March 1854. He was educated at Emmanuel College, Cambridge, and at the University of Berlin, was elected Fellow of Emmanuel College 1877 and was senior tutor there 1890–99. From 1897 to 1905 he was a member of the Meteorological Council and in the latter year was made director of the Meteorological Office. He was knighted in 1915. He has published important papers on 'Electrolysis'; 'The Pyrometer'; 'Meteorology' and with R. T. Glazebrook, 'A Text-book of Practical Physics' (1884); 'Air Currents and the Laws of Ventilation' (1907); 'Forecasting Weather' (1911), etc.

SHAW UNIVERSITY, an institution for the education of the colored race at Raleigh, N. C. It was founded under the auspices of the American Baptist Home Mission Society primarily for the education of colored preachers for the Baptist ministry. Henry Martin Tupper, D.D., was appointed president, and organized the first classes in 1865, in a negro cabin on the outskirts of the city; in March 1866 was formed the first class for colored women, and thenceforth the school has been for both sexes. In 1870 the present campus, including a whole city block, was purchased for $15,000; the buildings were put up with brick made by the students. The university obtained a charter from the State legislature in 1875. The organization of the university includes the Normal, Collegiate Scientific and Industrial departments, the Theological School, the Missionary Training School, the Leonard Schools of Medicine and Pharmacy and the Law School. The collegiate department includes a preparatory course of two years; the regular college course is four years; the degrees of A.B. and B.S. are conferred. Music is a part of the curriculum. The course in the medical school occupies four years; the Leonard Medical Hospital is a part of the university. Industrial training and work has been a feature from the first; each student is required to do some kind of manual work, and training is given in carpentering, cabinet, bent iron and machine-shop work, mechanical drawing, architecture and blacksmithing, sewing, dressmaking, laundering and domestic science. There is also a summer school and a night school (established 1899). The most important buildings include Estey Hall, Show Hall, the chapel, the medical dormitory, administration building, industrial building, laundry, Leonard Medical building, Hall of Pharmacy, hospital, Missionary Training building. The valuation of all property is $500,000. The tuition fees are small, and the institution is supported partially by the American Baptist Home Mission Society. The university occupies a leading place in the work of the education of the colored race, and has won the respect of the Southern people. It is unable to meet the demands made upon it, and is obliged to refuse admission to many students. The students in 1922–23 numbered 406, the faculty 30.

SHAWINIGAN FALLS, shä'ĭn-ĭ-găn, or **SHAWENEGAN FALLS,** Canada, town in Saint Maurice County, province of Quebec, on the Saint Maurice River, 70 miles northeast of Montreal, and on the Canadian Pacific and the Canadian Northern and Quebec railways. The falls nearby are 165 feet high and furnish abundant water power for manufactures, which include paper, carbide and aluminum. The town has a college, convent and hospital. It was incorporated in 1909. Pop. (1921) 10,606.

SHAWL, a cloth worn loosely over the shoulders, among civilized nations, chiefly by women, but in semi-civilized and barbarous peoples by both sexes. Shawls, on account of their simplicity, are ancient garments. They are mentioned by very old writers and are thought to be alluded to in the Bible (Ezek. xxvii). The most ancient shawls, as well as the finest are made in Cashmere, where the manufacture has been carried on in the same method for centuries, even the patterns of the shawls changing but little. The material is a very fine yarn made from the under wool of the shawl-goat of Tibet.

The yarn, known as pashmina, which is in reality a fine thread, commands a high price in the market, from $9 to $12 a pound. The dyes used are permanent. The patterns of the shawls are produced by weaving, and by embroidery. Where the design is to be embroidered the ground of the shawl is of a plain pashmina fabric. Very primitive looms are employed. Three or four men sometimes work at one loom, and for some of the finer shawls a year's time is necessary. The more ordinary shawls are produced about five a year, to each loom. Sometimes these shawls are woven in separate portions, and afterward joined together with great skill. Cashmere shawls sell as low as $70 or $80, but one of a first-class pattern and coloring will cost $1,200 to $1,500. Such a shawl will weigh about seven pounds and the texture will be very fine and close and the design intricate. About $150 will represent the cost of the materials used, $750 the labor expended and $600 the duty to be paid and other expenses. In the Punjab of India inferior shawls are manufactured at Nurpur, Amritsar and also in Kerman, Persia, the art having been carried over from Cashmere. The fine pashmina is mixed with the coarser goat's wool, called kaork. The finest shawls in Persia are also made of silk to resemble Cashmere shawls.

The production of shawls was until recent years a very important manufacture in France, and gave occupation to many in Paris, who not only furnished designs for those woven in their own country — chiefly at Paris, Lyons and Nimes — but also for shawl-manufacturers in England and Austria, and even for some woven in Cashmere. In 1867 it was estimated that the annual value of the French shawl trade amounted to nearly a million pounds sterling. At Paisley in Scotland, where for many years previous to 1860 the manufacture of shawls was of great importance, the trade originated in the beginning of the 19th century, and at its height occupied 8,000 looms. They were made of silk, wool or cotton, either separately or in combination; but the best-known class of Paisley shawls was manufactured of fine wool imitating Cashmere designs. Soon after the middle of the century the manufacture began to decline and has now ceased. Tartan shawls, however, chiefly of small size, for indoor or occasional wear, are still made at several places in Scotland.

SHAWNEE, shä-nē', Okla., the metropolis of Pottawatomie County, situated in the "Heart of Oklahoma" on the north bank of the North Canadian River, on the Chicago, Rock Island and Pacific, the Atchison, Topeka and Sante Fé and the Missouri, Kansas and Texas railways. The city has an altitude of 1,006 feet. Shawnee is the centre of a fertile and productive agricultural section of large extent, producing a large diversification of crops. The business interests of the city are large and constantly growing. The industries include flour mills, cotton oil mill, cotton compress and gins, large garment factory, foundry and machine shops, cigar factories, mattress factories, wholesale grocery houses and produce houses. The retail trade exceeds $3,000,000 annually and the city has a large jobbing business. The shops of the Rock Island and the Santa Fé are located here and the Missouri, Kansas and Texas maintains a freight terminal. The factory and railroad employees number 1,500, and the annual payroll exceeds $3,000,000. Shawnee has five banks with combined resources of $6,204,254 and deposits of $4,737,780.75 on their March 1919 statements. The postal receipts for the past year were $61,384. The city has a modern school system with eight ward and one modern high school building. There are 3,732 pupils in public schools and the Baptist State University and the Catholic University are located here with good enrolments. All religious denominations are represented with substantial buildings, there is a Carnegie public library and many acres of public parks. The city is under the charter form of government, electing a mayor, six councilmen and a city treasurer. All other officers are appointed by the mayor and confirmed by the council. The city has expended more than $800,000 for permanent municipal improvements, and is interested in the best and most modern civic developments. A complete sewer system ramifies the entire city. The government census in 1910 was 12,000 and the government census of 1920 gave 15,348 population.

SHAWNEE INDIANS (contracted from the Algonquian *Shawanogi,* «southerners»), an important tribe of the Algonquian stock of North American Indians, who, according to the best evidence, were originally an offshoot from the Lenape or Delawares, which migrated southward, hence their popular name. It is believed that they entered the present limits of the United States from the territory north of the Great Lakes via the lower peninsula of Michigan, various bands or divisions settling in southern Illinois, southern Ohio and (the larger part) on Cumberland River. A portion of the latter drifted southeastward to the headwaters of the Savannah, where they came in contact with the Cherokees and Catawbas, who forced them northward into Pennsylvania by 1707, while those remaining on Cumberland River were driven away by combined Cherokees and Chickasaws. They were first mentioned under the name Ouchaouanag, in 1648, as living to the westward of Lake Huron; later in the century they were found by La Salle in northern Illinois, while others were settled along the Ohio and the Cumberland, and indeed had extended into Maryland, Virginia and Pennsylvania, and even as far south as Mobile, Ala., in the country of the Creeks. They were at war with numerous tribes at various periods, as well as with the French, and later with the United States, from the beginning of the French and Indian War until about 1795, during which time they had concentrated north of the Ohio River. Anthony Wayne's victory, followed by the Treaty of Greenville in 1795, terminated the hostilities of the Indians of the Ohio Valley region, a considerable part of the Shawnees moving to Missouri, within Spanish territory, while a few years later others migrated to White River, Ind., on invitation of the Delawares. Early in the 19th century, Tenskwatawa, the «Shawano Prophet,» brother of the celebrated Tecumseh, preached a new doctrine the acceptance of which would open the way to future happiness and a return of the old order of things, not unlike the «Ghost Dance» religion which in-

volved so many of the Western tribes beginning with 1890. The Prophet gathered many adherents from far and wide, who established themselves at the mouth of Tippecanoe River, Indiana. To overcome their hostile demonstrations, General Harrison in 1811 led an expedition against them, resulting in the defeat of the Indians in the celebrated battle of Tippecanoe and the destruction of their settlement, while the tragic death of Tecumseh, their recognized leader, in the following year, tended to break their hostile spirit. The Shawnees of Missouri sold their lands to the government in 1825 and were assigned to a reservation in Kansas, but meanwhile a large number of them had departed for Texas where they settled on the headwaters of Sabine River until driven out in 1850. In 1831 the Ohio Shawnees ceded their lands to the United States and joined their kindred in Kansas, and in 1845 a large part of these Kansas Shawnees moved to the Canadian River in Indian Territory, where they have since been officially known as Absentee Shawnees. In 1867 the mixed Shawnees and Senecas who had moved from Ohio to Kansas about 1831, also migrated to Indian Territory, where they became known as Eastern Shawnees, and in the meantime the rest of the tribe joined the Cherokees in Indian Territory, with whom they are now incorporated. The Shawnees known as Black Bob's band are those who at first refused to move from Kansas with the others. There are also Shawnees among the Tuscaroras in New York, and others are incorporated among the Teton Sioux, while in 1840 a number of the tribe accompanied a party of trappers to the Tulare Valley of California.

The Shawnees were early described as of good stature, an active, sensible, cheerful people, full of laughter and drollery, courageous, high-spirited and manly, yet "the most deceitful in human shape." Each town had its headman. Polygyny was common and infanticide frequently practised. It was said that most of the Shawnees could speak several languages, due, no doubt, to their roving propensities when occasion required, although they were agriculturists in the main. The tribe had four phratral organizations, the members of which occupied different sides in the council-house during public assemblies. So far as known 13 gentes were recognized. Of the population of the Shawnees in early times there is no reliable information, the estimates ranging from 1,000 in 1736 to 2,000 in 1817. In 1910 the population of the Shawnee aggregated 1,338, of whom 1,300 were in Oklahoma, part on the Quapaw Reservation, part on the Sauk and Fox Reservation, while the larger proportion are incorporated with the Cherokees.

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F. W. Hodge,
Museum of the American Indian, Heye Foundation, New York.

SHAYA ROOT, the root, or the plant itself, of *Oldenlandia umbellata,* of the madder family, and sometimes called Indian madder. It is a slender branching annual, with narrow opposite leaves, and small flowers in panicles. It grows wild, and is also cultivated, on the Coromandel coast, the outer bark of its roots yielding the well-known durable red-dye seen in Indian cotton goods. The leaves have been used as an expectorant in native medicine.

SHAYS, shāz, Daniel, American soldier, leader of the "Shays' Rebellion" in Massachusetts: b. Hopkinton, Mass., 1747; d. Sparta, N. Y., 29 Sept. 1825. He is first heard of as an ensign at Bunker (Breed's) Hill, was made captain 1 Jan. 1777 and resigned from the service. There is testimony that he was a good soldier. The rebellion of 1786–87, in which he was the directing figure, arose from a spirit of unrest and lawlessness then generally on the increase in the country, but more particularly from special reasons for dissatisfaction in Massachusetts. Among these were the wastefulness in the costs of litigation, the high salaries attached to public offices, and above all the exorbitant land taxation. The time was one of financial depression, and Governor Bowdoin in his endeavors to sustain the credit and diminish the debt of the State undoubtedly caused heavy burdens to fall upon poorer citizens inland. Sheriffs' and County Courts were kept busy. In the fall of 1786 five or six hundred malcontents, under command of Shays, gathered at Springfield, the purpose being to overawe the Supreme Court about to sit there and prevent the finding of indictments. After a three days' session the court adjourned. In November, when the Court of General Sessions attempted to sit at Worcester, Shays filled the courtroom with an armed force and no court could be held. Washington was deeply alarmed at the reports of these early successes of the insurgents. "It was but the other day," said he, "that we were shedding our blood to obtain the constitutions under which we now live — constitutions of our own choice and making — and now we are unsheathing the sword to overturn them." An army of 4,400 was now enlisted for 30 days by Governor Bowdoin, and the money for equipment and munitions was raised by a loan from wealthy citizens. The command was given to Gen. Benjamin Lincoln, a Revolutionary veteran. On 25 Dec. 1787 Shays, with 1,100 troops, made an attack on the Springfield arsenal, guarded by General Shepard with 1,200. Shepard at first commanded his men to fire above the insurgents' heads, but as the latter continued to advance in good order, a volley was directed into their ranks. Four fell, and the insurgents retreated in much confusion, continuing their flight, with many desertions, from town to town. Lincoln pursued them to Petersham, where on 3 February 150 were taken and the rest dispersed. The rebels continued to gather in small bands, for some months, but no large force again appeared. The greatest clemency was shown toward the leaders, and a very general amnesty proclaimed. Shays removed to Vermont, was pardoned and went thence to Sparta, N. Y., where he obtained a pension for his Revolutionary services. Consult McMaster, 'History of the People of the United States' (Vol. I, 1883); Minot, 'History of the Insurrections in Massachusetts in 1786 and the Rebellion Consequent Thereon' (Boston 1810); Holland, 'History of Western Massachusetts' (Springfield 1855); *New England Magazine* (new series, Vol. XXIII, No. 5, January 1901); 'Reminiscences of Shays' Rebellion'; Rivers, 'Captain Shays.'

SHAYS' REBELLION. See Shays, Daniel.

SHE, a romance by Rider Haggard (1887), a young Englishman goes to Africa to avenge the death of an Egyptian ancestor, whose strange history has come down to him in an old manuscript. The ancestor, a priest of Isis, had been slain by an immortal white sorceress somewhere in Africa. The sorceress, "She," and the Englishman finally meet, recognize a mysterious bond between them and, at the climax of the story, visit a place where burns a mysterious fire which gives thousands of years of life, loveliness, strength and wisdom or else swift death. "She" for the second time passes into the flame and is instantly consumed.

SHE-OAK, any one of the small trees or shrubs of the peculiar genus (*Casuarina*) of oaks, native to the East Indies and Australia. Although closely related to oaks and walnuts, the she-oak has no true leaves, substituting whorls of long drooping, slender deciduous branchlets and is said to resemble both Scotch firs and giant horsetails, in its wide-spreading top. It casts but little shadow. The branchlets are acidulous in taste and are liked by cattle. A small and round fruit is called the she-oak apple and is of bitter taste and used to flavor beer. The wood of the she-oak is extremely hard, makes excellent fuel and is valuable for woodworking; in some species it is reddish, with light and dark streaks, and is called beefwood. The Australians make boomerangs and other weapons out of its roots. *Casuarina stricta* is the species known as coast she-oak, or sometimes as he-oak; the forest or erect she-oak is *C. suberosa* and the desert one is *C. glauca.*

SHE STOOPS TO CONQUER. Though he was thoroughly a child of his time, it was Goldsmith's peculiar genius that he went to life for his influences rather than to books. The central feature of 'She Stoops to Conquer' has some resemblances with Farquhar's 'The Beaux' Stratagem,' but its veritable source was undoubtedly an episode in the youthful career of Oliver himself.

If in the theatre Goldsmith seems to have been more of a reformer than elsewhere the reason is not far to seek. The refinements of that sentimental comedy which in his day controlled the stage were repugnant to him as an instinctive artist. Before his playwriting days Goldsmith had ridiculed "genteel comedy" and in the "low" passages of 'The Good-Natured Man' had resolutely entered the lists against it. 'She Stoops to Conquer' is the author's second and more successful play. Less artificial than the comedy of manners, to which general class it belongs, it has more of Fielding in it than of Congreve. No one but Goldsmith could have given such a view of a country house. And even the London characters are freshly viewed. Their city manners are crossed with the forthrightness of nature. Raillery and repartee dwindle in importance before character and atmosphere. The difference between Goldsmith and Sheridan was that the former knew life whereas the latter knew only the stage. Squire Hardcastle is drawn without a stroke of over-elaboration. Less sportive than Tony he digs as deeply into the memory; but Tony and his mother linger as something more than caricatures. Kate Hardcastle is as much a product of observation as Millamant of 'The Way of the World' is a product of thought and Maria of 'The School for Scandal' is a product of the stage. It is the veritableness of the atmosphere of the play that saves it from, what the plot would make it, sheer farce. Goldsmith was not fortunate in his relationships with Colman and Garrick, the two monopolists of the theatre of his day. Yet upon its performance by Colman at Covent Garden Theatre, 15 March 1773, 'She Stoops to Conquer,' "succeeded prodigiously" (Walpole). It holds the stage in frequent revivals to this day. *Editions:* Masson, D., *Globe* edition (1869); Dobson, A., ed., Belles Lettres Series (1905); Temple Dramatists (1900); Everyman's Library (Vol. 415). Consult Forster, 'Life and Adventures of Oliver Goldsmith' (1848); Dobson, A., 'Memoir' (1899); 'Cambridge History of English Literature.'

Thomas H. Dickinson.

SHEA, shā, John Dawson Gilmary, American historian: b. New York, 22 July 1824; d. Elizabeth, N. J., 22 Feb. 1892. His father was principal of the Columbia College Grammar School where he gained his education, and subsequently he studied law and was admitted to the bar in 1846. He soon turned to literature, was connected in an editorial capacity with Frank Leslie's publishing house and later edited the *Catholic News.* But for many years his attention was given to historical research in preparation of his 'History of the Catholic Church in the United States,' the fourth volume of which was in process of publication at the time of his death. He was connected with many historical societies in America and Europe and was the first president of the Catholic Historical Society of the United States. His published works include 'The Discovery and Exploration of the Mississippi Valley' (1853); 'History of the French and Spanish Missions among the Indian Tribes of the United States' (1854); 'The Catholic Church in Colonial Days' (1883); 'The Hierarchy of the Catholic Church in the United States' (1886); 'Early Voyages Up and Down the Mississippi' (1862); 'Novum Belgium, An Account of the New Netherlands in 1643–44' (1862); 'The Operations of the French Fleet under Count de Grasse' (1864); 'Life of Pius IX' (1875); 'Story of a Great Nation' (1891), besides many translations and other works.

SHEAFFE, shēf, Sir Roger Hale, Canadian general and administrator: b. Boston, Mass., 15 July 1763; d. Edinburgh, Scotland, 17 July 1851. He was appointed ensign in the

British army in 1778 and was promoted lieutenant in 1780. He served in Ireland in 1781–87 and in Canada in 1787–97, attaining rank of lieutenant-colonel in 1789. He was on duty in Holland in 1789 and accompanied the expedition to the Baltic in 1801. He returned to duty in Canada in 1802, reached the rank of major-general in 1811 and was on leave for a year. He was again on active duty in 1812–13, and on 13 Oct. 1812 he recaptured Queenstown from the United States troops. He retained command of the British forces and administered the government of Upper Canada until 1813. He was knighted in 1813, and in 1838 he was nominated general.

SHEAR, Cornelius Lott, American plant pathologist: b. Coeymans Hollow, N. Y., 26 March 1865. He was graduated at the New York State Normal School at Albany in 1888, at the University of Nebraska in 1897, and took his Ph.D. at George Washington University in 1906, studying also at the universities of Munich, Berlin, Leyden and London. From 1895 he was connected with the United States Department of Agriculture where since 1902 he has been plant pathologist. He was editor of the *Asa Gray Bulletin* in 1898–1900; associate editor of the *Plant World* in 1900–05, and since 1911 has edited *Phytopathology*.

SHEARD, shērd, **Charles,** Canadian physician: b. Toronto, Ontario, 15 Feb. 1857. He was educated at the Upper Canada College and at Toronto University, and subsequently practised at Toronto. He was medical health officer of Toronto in 1893–1910; chairman of the provincial board of health in 1909, and in 1902 he was president of the Canadian Medical Association.

SHEARD, shērd, **T. F. M.,** English painter: b. Oxford, 16 Dec. 1866. After his graduation in 1889 he went to Paris and studied painting under Courtois, Rixens, Lefèbre and Rigolot. He has since then exhibited at the Salon, Royal Academy and the Royal Institute of Water Color Painters. He was awarded a bronze medal at the Paris Exhibition of 1900. Since 1915 he has been professor of art at Queen's College, London. He is fond of Eastern subjects, and scenery flooded with sunlight, and among his paintings of this character are 'A Market Morning in a City of the Sahara'; 'An Arab Blacksmith'; 'An Arab Fête'; 'Desert Tribesmen Returning from a Raid,' etc. Among his scenes of English peasant life may be mentioned 'Birds of a Feather'; 'The Outcast'; 'Parted'; 'The Price of Victory'; 'Hull Docks'; 'End of the Day'; etc.

SHEARMAN, shēr'man, **Thomas Gaskell,** American lawyer: b. Birmingham, England, 25 Nov. 1834; d. Brooklyn, 29 Sept. 1900. At nine he came to America with his parents and in 1857 took up his residence in Brooklyn. He was admitted to the bar in 1859, and in 1868 formed a partnership with David Dudley Field. Later John W. Stirling entered the firm which was continued after 1873 by Shearman and Stirling. This firm defended Jay Gould in suits resulting from the gold panic of 1869, and Henry Ward Beecher in the suit brought against him by Theodore Tilton. Shearman was an advocate of absolute free trade and a vigorous propagandist of Henry George's single tax theories. From early years he contributed to legal literature and was joint author of 'Tillinghast and Shearman's Practice, Pleadings and Forms' (1861–65) and 'Shearman and Redfield on Negligence' (1869). He prepared for the commissioners of the New York code the 'Book of Forms' (1861) and the major part of the Civil Code relating to obligations (1865). He also published 'Talks on Free Trade' (1881); 'Pauper Labor of Europe' (1885); 'Distribution of Wealth' (1887); 'Owners of the United States' (1889); 'The Coming Billionaire' (1890); 'Crooked Taxation' (1891); 'Taxation of Personal Property' (1895); 'Natural Taxation' (1895; 3d ed., 1898).

SHEARS. See Cutlery; Hardware Industry in America.

SHEARWATER, a sea-bird which skims close to the surface of the water in search of fishes and floating animal matter upon which it feeds. The shearwaters are larger than the petrels and differ from both them and the fulmars in their long, slender bills, both mandibles of which are hooked at the end, and by the short broad nostril-tubes. The wings are long and narrow and the tail rounded or wedge-shaped, never forked. In habits they generally resemble the petrels (q.v.). Ten species are recorded as occurring on the North American coast, the best known being the common shearwater (*Puffin major*) and the sooty shearwater (*P. stricklandi*). Sailors call these birds «mutton-birds,» because of the excessive fatness of the young which are good eating and the search for which has nearly exterminated the once common British species (*P. brevicaudus*). Consult Newton, 'Dictionary of Birds' (New York 1896).

SHEATH-BILL, a family of limicoline birds (*Chionididæ*) belonging to the order related to the plovers. The wings are long and pointed, the tail being of moderate size. The bill is short and stout, compressed, strongly arched at its tip and provided at the base with a horny sheath which protects the nostrils. The tarsi are short and stout. The white sheath-bill or kelp-pigeon (*Chionis alba*) is the best-known species. It inhabits the shores of the islands off the southern end of South America. Its color is pure white, the legs reddish-black and its average length 15 inches. These birds feed on mollusks, carrion, fishes, crustacea, seaweeds and other food which they can pick up on the seashores. On land they much resemble pigeons, but when flying in flocks at sea are gull-like in aspect. Cook in his 'Third Voyage' says its flesh is equal to duck, but other accounts represent the flesh as very unpalatable, probably on account of the bird's food. Another species was made known in 1842 by Dr. Hartlaub, one smaller than the *Chionis alba*, with similar plumage, but having the bill and bare skin of the face black and the legs much darker. The sealers of Kerguelen Land call it the sore-eyed pigeon, from its prominent fleshy orbit.

SHEBA, shē'ba, or **SABA',** Arabia, the ancient capital of Arabia Felix. Its site has not been determined, but it was a great commercial centre of the Semitic tribes. The Sabæans carried on an extensive trade with India, Europe, Egypt and Syria, in frankincense, gold, ivory, ebony, fine textiles and sweet spices, and for this purpose had depots in northern Arabia and Ethiopia. Their wealth became famous in the Orient and their queen paid a visit to Solomon with rich gifts, as cited in the Scriptures. They worshipped natural objects, especially the sun and moon. In the 8th century they were subject to the Assyrians; in 24 B.C. the Romans sent an unsuccessful expedition into their territory and in the 2d, 4th and 6th centuries they became subject to the Ethiopians. Consult Glaser, 'Geschichte und Geographie Arabiens' (Berlin 1890) and Gunkel, 'Genesis' (3d ed., Göttingen 1910).

SHEBOYGAN, shē-boi'găn, Wis., city, county-seat of Sheboygan County, situated on Lake Michigan at the mouth of the Sheboygan River and on the Chicago and Northwestern Railroad, 52 miles north of Milwaukee. It has a good harbor and steamer connection with all the principal lake ports; a regular line of freight and passenger steamers ply between the city and the other ports on the west shore of Lake Michigan all the year. An interurban electric line connects the city with Milwaukee and the City Electric operates an interurban line to Plymouth and Elkhart. The first settlement was made in 1836. The place was incorporated as a village in 1846 and in 1853 was chartered as a city. Sheboygan is the industrial and commercial centre for a large and fertile agricultural region. The chief industrial establishments are seven chair factories, 12 furniture factories, one piano factory, two toy factories, two tanneries, three shoe factories, three enameled-ware works, three carriage factories, one auto-truck factory, foundries and machine shops, lime-kilns and brick manufactories, boiler shops, storage warehouse for cheese, etc. The number of industrial establishments is 132; number of persons engaged in manufactures, 8,056; primary horse power, 13,785; capital invested, $21,481,000; services, $4,358,000; salaries $988,000; value of products, $17,509,000. There are four State banks with a total capitalization of about $950,000 and over $7,000,000 in deposits. The principal public buildings are a government building, county courthouse, city hall and other municipal buildings, churches and schools. There are six public parks; in one of them is an artesian well, the waters of which contain considerable mineral salts. There are 29 churches and an asylum for the chronic insane, a city almshouse, a home for the friendless, a sanitarium and a hospital. The educational institutions are a day school for the deaf, a high school, an industrial school, public and parish elementary schools and a public school library containing about 5,000 volumes and a public library which in 1915 contained 15,079 bound volumes. Pop. (1920) 30,995.

SHECHINAH. See Shekinah.

SHEDD, shĕd, **William Greenough Thayer,** American theologian: b. Acton, Mass., 21 June 1820; d. New York, 17 Nov. 1894. He was graduated from the University of Vermont in 1839, from Andover Theological Seminary in 1843 and in 1844–45 was pastor of the Congregational church in Brandon, Vt. He was professor of English literature in the University of Vermont in 1845–52, of sacred rhetoric and pastoral theology at Auburn Theological Seminary in 1852–53 and of ecclesiastical history and lecturer on pastoral theology at Andover in 1853–62. He acted as assistant pastor at the Brick (Presbyterian) Church, New York, in 1862–63, was appointed to the chair of Biblical literature at Union Theological Seminary, New York, in 1863, and in 1874 was transferred to that of systematic theology, which he occupied until 1890. His publications include 'The Method and Influence of Theological Studies' (1845); 'The True Nature of the Beautiful and its Influence upon Culture' (1851); 'The Nature and Importance of Natural Rhetoric' (1851); 'Lectures on the Philosophy of History' (1856); 'A History of Christian Doctrine' (1863); 'Homilectics and Pastoral Theology' (1867); 'Sermons to the Natural Man' (1871); 'Theological Essays' (1877); 'Literary Essays' (1878); 'Commentary on St. Paul's Epistle to the Romans' (1879); 'Sermons to the Spiritual Man' (1884); 'Doctrine of Endless Punishment' (1885); 'Dogmatic Theology' (1889–94); 'The Proposed Revision of the Westminster Standards' (1890), etc. He also published 'Eloquence a Virtue, or Outlines of a Systematic Rhetoric' (1850), a translation from the German of Dr. Francis Theremin; 'A Manual of Church History' in two volumes, translated from the German of Heinrich Ernst Ferdinand Guericke (1857); edited seven volumes of Coleridge's works, with 'Introductory Essays' (1853); 'The Confession of Saint Augustine,' with introductory essay (1860); and wrote introductions to Asbury's translation of Ackerman's 'The Christian Element in Plato and the Platonic Philosophy' (1860) and to McCosh's 'Intuition of the Mind' (1864).

SHEE, shē, Sir **Martin Archer,** English painter: b. Dublin, 23 Dec. 1770; d. Brighton, England, 13 Aug. 1850. He was introduced in 1788 to Sir Joshua Reynolds by Edmund Burke, and in the same year became a pupil in the Royal Academy, to the exhibition of which he contributed his first picture in 1789. Although by no means the best portrait painter of his time, he was, with one or two exceptions, the most fashionable. In 1800 he was chosen a member of the Royal Academy, and in 1830, on the death of Sir Thomas Lawrence, he was elected president and knighted. He also aspired to literary distinction and in 1805 and 1809 published two parts of a poem entitled 'Rhymes on Art,' in 1814 'The Commemoration of Sir Joshua Reynolds, and other Poems,' which called forth the praise of Byron, in his 'English Bards and Scotch Reviewers':

> "And here let Shee and genius find a place,
> Whose pen and pencil yield an equal grace;
> While honors, doubly merited, attend
> The poet's rival, but the painter's friend."

Among his portraits are those of William IV and Queen Victoria; all his work is pleasing, but there is an unpleasant tendency to unnatural redness in his flesh tints. The National Portrait Gallery contains numerous examples of his works.

SHEEDY, Rev. Morgan M., author, lecturer, priest: b. Liscarroll, County Cork, Ireland, 8 Oct. 1853. He was the son of Michael and Mary (Madden) Sheedy; on maternal side, member of a family which has given many priests and distinguished writers to the world. He was educated at Saint Colman's College, Fermoy, and at the College of Maynooth; received degree of LL.D from Notre Dame Uni-

versity, Indiana, and Mount Saint Mary's, Maryland. Ordained in the Pittsburgh Cathedral by the late Bishop Tuigg, 23 Sept. 1876; assigned as professor of theology and history at Saint Michael's Seminary, where he continued until the institution was closed. First president of the Catholic Summer School of America and director of the Reading Circle Union; vice-president of the Catholic Total Abstinence Union for four years. Founder of the Pittsburgh Polytechnic Society. He lectured for the Academy of Science at the Champlain Summer School and the first session of the Catholic Winter School in New Orleans. At present permanent rector of Saint John's Church, Altoona, Pa. Editor of *The Quarterly* and a frequent contributor to the Catholic press and magazines, the *Catholic World*, The *American Ecclesiastical Review*, etc. Author of 'Briefs for Our Times'; 'Social Problems' (dealing with the labor question); 'Christian Unity,' etc.

SHEEHAN, shē'ăn, **Patrick Augustine**, Irish Roman Catholic canon and novelist: b. Mallow, County Cork, 17 March 1852; d. 6 Oct. 1913. He was educated at Maynooth College and was ordained in 1875. He held various curacies until 1895 when he became parish priest of Doneraile, and in 1903 he became also canon of Cloyne. He was known as a writer of essays, poems and novels, all of which are characterized by an intimate knowledge of Irish life and permeated with a strong Roman Catholic bias. Author of 'Under the Cedars and Stars' (1903); 'The Triumph of Failure' (1899); 'My New Curate' (1900); 'Early Essays and Lectures' (1906); 'The Blindness of the Rev. Dr. Gray' (1909); 'The Queen's Fillet' (1911); 'Graves at Kilamorna' (1915), etc.

SHEEP. The sheep (genus *Ovis*) belongs to the family of ruminants termed Bovidæ, of which the ox (*Bos*) is a typical representative. Other animals such as the goat, musk-oxen, chamois and antelope belong to the same family but the sheep represents a distinct genus for which the name *Ovis* has been adopted, and, as a species, the domesticated sheep has been given the name *Ovis aries*.

Sex and Age Names.— The male sheep is known as a *ram* or *buck*. The term buck, however, is not regarded as good usage, but it is almost universally applied to male sheep in the western part of the United States. The female sheep is known as a *ewe* and the unsexed male as a *wether*. From birth until the age of 12 months is attained the young of sheep are called lambs; from 12 to 24 months of age they are called yearlings; from 24 to 36 months, two-year olds, et cetera.

How to Determine the Age of Sheep.— Until sheep become four years old their age can be approximated by their teeth. The temporary or lamb teeth, 20 in number, are small; the permanent teeth, of which there are 32, are broader and longer. As a rule the two temporary teeth in the middle of the front part of the lower jaw are replaced by permanent teeth when the animal is about 12 months old and two more appear each year until at four years of age all of the front teeth are permanent, making what is called a full mouth. Therefore, a sheep showing two broad teeth in front is called a yearling; one showing four broad teeth, a two-year old; one showing six such teeth, a three-year old. Beyond the fourth year it is not possible to approximate age except in a very general way, but the teeth of a very old sheep are likely to be spread apart, missing or they may be worn down short. Other indications of advanced age are a sunken appearance over the eyes, comparatively short wool that is more or less uneven in length and a tendency toward emaciation.

Habits.— Sheep are ruminants and while they are fond of concentrated feeds they must have bulky feeds such as grass and hay. They eat all of the grasses except the very coarsest varieties and they are very fond of the cultivated leguminous plants. They eat most of the weeds common to the farms and ranges of the United States and they will feed on young tree-growth more than any other domestic animal in America except goats.

Sheep like an extensive range and comparatively short herbage. Because of their mobile lips and sharp incisor teeth they are structurally adapted to feeding on short grass. They enjoy changing from old to new pastures and they delight in feeding on the high places more than they do on the low places in their pastures. Sheep are able to exist without water longer than most domestic animals, but nevertheless they should have free access to it. Even in cold weather they will drink from two to four quarts daily. They prefer running water to still water.

In seeking a bedding-place sheep prefer relatively high ground where there is good air and water drainage. It is only in the severest periods of storm that they abandon such a place for a lower, wind-protected location. Young sheep seek high places more readily than do older ones; yearlings will feed high up on a hillside more readily than old ewes.

Breeding Habits.— Most domesticated breeds produce offspring but once a year. In the United States the mating is in the autumn, because it is at this time that the nights turn cool and this seems to have a marked influence in causing the ewes to come in heat (œstrus). The normal gestation period for ewes is about 146 days. Ewes commonly give birth to one or to two lambs. Occasionally triplets are born and in rare instances four or more. But since the female sheep has only two teats, breeders do not desire more than two lambs to each ewe.

Gregariousness.—All sheep possess the flocking instinct, but it is more pronounced in some breeds than in others. This instinct is of great importance in regions where sheep are herded on rough unfenced range, and a breed of sheep must be kept that possesses it in the most marked degree. When a sheep is separated from the flock it is an indication that it is either lost, ill or injured.

Closely associated with the gregarious instinct is the instinct to follow a leader. «Where one sheep goes all others will follow» is literaly true even though it involves a long leap or a plunge into the water.

No other domestic animal is so timid and so unable to defend itself as the sheep. On this account it is a subject of prey for such animals as the wolf, coyote, dog, bobcat and mountain lion. In all countries where sheep are kept there are predatory animals of the canine and feline groups that harass sheepmen by the attacks they make upon their flocks.

Types.— Sheep were probably first domesticated on the high, treeless plateaus and mountains of Turkestan, Asia, but they have been adapted to all sorts of climatic conditions and to all types of soil. Under the influence of not only soil and climatic conditions but of economic and social conditions as well, different types of sheep have been developed. At the present time most of the improved sheep may be roughly grouped under two types; one known as the fine wool type, the other as the mutton type. As these type names infer, there are sheep that have been developed primarily for their wool and others primarily for their mutton. In certain restricted areas of the world, notably in Europe and Asia, emphasis has been placed on the dairy qualities of sheep and in Asia there are types whose value depends chiefly upon the fur-like nature of their hairy covering, the lambskins of which yield what are known as the Persian, Astrakan, Broadtail and Krimmer furs.

The wool type of sheep was developed in Spain and it is known the world over as the Merino. For a long time Spain denied these sheep to the remainder of the world, but at the close of the Napoleonic wars she was no longer able to retain her monopoly on them and they were rapidly distributed in other countries. Before this time, however, the king of Spain gave permission for some of these sheep to be sent to a few other European countries and Saxony in Germany had demonstrated that they could be successively raised outside of their native home. Consequently there was great demand for them when they became available to all countries. Germany, the United States and Australia specialized in them and made them better than they had been at home.

In the United States, the Merino was first called the Spanish Merino. But various strains that had been kept separate and distinct in the native home were mingled in America. This together with different ideals in breeding soon resulted in a modified type which was first called the Vermont Merino and later the American Merino.

American Merino breeders aimed at great weight and fineness of fleece. In order to get weight, large wrinkles and folds were developed in the skin. A maximum density of wool fibres on the surface of the skin was sought after; an attempt was made to grow wool on all parts of the body and on the face and legs as well and the greatest amount possible of yolk (a combination of the perspiratory and fatty secretions from the skin) was secured. Very little attention was given to mutton properties.

This kind of sheep satisfied earlier conditions in the United States because wool was almost the sole product from flocks in regions west of the Alleghany Mountains. There was no object in producing mutton, for transportation facilities were undeveloped. If they had been developed the population of the country was too small to justify a large production of mutton and facilities for exportation were inadequate. This situation, together with the fact that no other sheep has the gregarious instinct so intensely developed and hence is not as suitable as the Merino on expansive, unfenced ranges, explains why the Merino has always been the popular sheep in new countries and why they were adopted not only by the United States, but also by New Zealand, Australia, the Argentine and South Africa.

But as demand for mutton increased in the United States because of the increase in population and as transportation developed so that this demand could be met, changes became necessary in Merino breeding. There was also a change in the style of cloth which demanded the production of longer wool—a wool at least two and one-half inches in length so that it could be spun into worsteds. As a result strains were developed that grew longer wool and produced more meat.

At present there are three types of American Merinos known as the A, B and C types. The A type is extreme in skin folds and wrinkles, density of fleece and yolk in the wool. It is what might be called an ultra wool type. The C type or Delaine is almost free from folds and wrinkles, and its wool is not so dense, has less yolk and is longer than that of the A type. It is wider, thicker and heavier and altogether much more suitable for mutton than the A type. In practically all respects, the B type is intermediate between the A and C types. Most Merino rams have horns, but the ewes are hornless. Rams weigh from 130 pounds to 200 pounds and their weight of fleece in the grease (i.e., weight just as it comes from the sheep) ranges from 25 pounds or more in the A type to 15 pounds or more in the C type. Ewes weigh from 90 to 150 pounds and they shear from 15 pounds up in the A type to 10 pounds up in the C type.

Australian Merinos differ from American Merinos mainly in the nature of their wool. The Australian breeders have bred for long, fine wool and not for excessive yolk as have the American breeders, who have specialized in the A and B types.

In 1786 the French government began growing Merinos, having for its object a combination of mutton and wool. A number of years later some of these sheep were taken to Germany. In both countries a large, thick sheep was developed. Importations were brought to the United States as early as 1840 but they did not attain popularity until toward the close of the century. They are now known as the Rambouillet, and in the United States they outnumber all other Merinos combined. Rams weigh from 225 to 250 pounds; ewes from 140 to 170 pounds. Rams yield from 15 to 25 pounds of grease wool; ewes from 10 to 18 pounds.

The Mutton Type.— England is the native home of the mutton type of sheep. This type was intensely developed by Robert Bakewell who began his work about 1760. Prior to his time there were two general types of sheep in England. One of these was a large, coarse sheep that grew long, coarse wool and yielded a fleece weighing from 7 to 12 pounds. These sheep were kept principally on the low fertile lands of Lincoln, Leicester and on the hills of Gloucester. It was with these sheep that Bakewell accomplished his work and he founded the breed known as the English Leicester.

The other type common to England was much smaller, better able to travel, and was suited to the hills and lighter soils. It produced short, rather fine wool and yielded fleeces weighing from two to five pounds.

Following Bakewell, there was a great era of mutton improvement brought about by careful selection in some cases, by crossing and selection in others. From the lowland sheep the Longwool mutton breeds have been developed, namely, the Leicester, Cotswold, Lincoln, Romney Marsh and others.

All of the long wool breeds strongly resemble each other; they are large, up-standing sheep with white faces and legs. Their wool is coarse and long, ranging from 8 inches in Leicesters to more than 12 in Lincolns.

From the smaller, lighter shearing type, the medium wool mutton breeds have come. In this group the most prominent in America are the Down breeds such as the Southdown, Shropshire, Hampshire, Suffolk and Oxford Down. The Oxford Down, however, is a cross between the Hampshire, a medium wooled breed, and the Cotswold, a long wooled sheep. The Down breeds have dark faces and legs — the darkest being the very deep brown of the Hampshire and Suffolk, and the lightest, the light grayish brown of the Southdown. The Southdown is regarded as the best improved breed in mutton qualities, but in this respect it is closely approached by the other Down breeds. Of the Down breeds, the Southdown has the shortest, lightest fleece, while the Oxford Down has the longest fleece.

There are numerous other medium wool breeds, the most prominent in the United States being the Dorset Horn and Cheviot, which differ from the Down breeds in that they have white faces and legs. Both the males and females have horns in the Dorset Horn breed.

Approximate Body and Fleece Weights of the Mutton Breeds Prominent in the United States.

BREED	Body weight		Weight of fleece, pounds
Longwools	Rams	Ewes	
Leicester	250	185	12
Cotswold	300	200	14
Lincoln	325	225	15
Romney Marsh	275	200	12
Medium wools			
Southdown	185	145	7
Shropshire	225	170	9
Suffolk	250	180	8
Hampshire	275	200	9
Oxford Down	285	200	11
Dorset Horn	275	190	7
Cheviot	175	140	7

When refrigeration and transportation developed to the point where it was possible to ship sheep or their carcasses from outlying points to the centres of dense population there arose a demand for the mutton breeds in all countries where improved flock husbandry is practised. In some regions the mutton breeds have replaced the Merinos, but in many others where some Merino blood is indispensable, they have been crossed with the Merino to effect mutton improvement. Breeders in New Zealand by crossing the Longwool breeds on the Merino secure a blend that represented what was needed. Then they bred the cross-bred animals together and thereby in time fixed a new type which is known as the Corriedale. Some of these sheep have been imported to the United States, and crosses between the Longwools and Rambouillets are being made in this country with a view to producing a desirable type of sheep for the intermountain region.

Types of Sheep Raising.— There are two general types of sheep raising. One involves keeping relatively large numbers on an extensive range; the other in keeping comparatively small flocks on farms where diversified agriculture is practised.

The first, generally known as the range method, is followed in the intermountain regions of the United States and Canada, in South America, South Africa, Australia, New Zealand and parts of Asia. Under this method in the United States the sheep are kept in the care of a herder on unenclosed land in bands containing from 1,500 to 3,000 head. The herder requires the whole or part time assistance of a camp tender, whose duty it is to get provisions, and move camp after selecting a new site where there is sufficient pasture; he also assists in cooking, and in counting the sheep. In winter the sheep are kept on the semi-arid plains; in spring and fall in the foot-hills, and in the summer in the national forests on the mountains. It is now customary to supplement the feed on the plains with grain and hay during severe periods in winter. All of the hay and some of the grain are grown on dry farms and irrigated land in the West. The remainder of the grain is shipped in from the Middle West and South. Australia and New Zealand have modified the range method by fencing in vast areas of land. As a result the sheep do not require a herder; they can feed according to their own inclination and hence thrive better than do sheep under a herder's care.

The keeping of small flocks on farms, known as the farm flock method, is practised in the central and eastern parts of the United States, eastern Canada, Great Britain and various other European countries. Flocks vary in size from a few head up to several hundred. As a rule farm flocks share their pastures with other classes of livestock, but in England they are often fed on quick-growing forages between hurdles. This constitutes an intensive method of handling and results in rapid growth, high finish and altogether a very superior mutton product.

Farm flocks are usually kept in regions where the climate is variable and hence special provision has to be made for feeding in winter and for sheltering in rainy and cold weather. Stored grain and roughages must be provided for. Of the grains, oats, corn, kaffir, barley and speltz are all suitable, but everything considered, oats are regarded the best for all but fattening sheep. The legume hays such as clover, alfalfa and soy beans are the best roughages, but good use can be made of corn silage and corn stover. In fact corn silage supplements splendidly with the legume hays. Some use can be made of oat and wheat straw as roughages, but they should be used in connection with the legume hays.

In northern United States, Canada and Great Britain, roots, such as Swedish turnips and Mangel wurtzels, are extensively used as feed for sheep. Being succulent they are valuable as a supplement to grain and hay.

Sheep require shelter chiefly as a protection from precipitous weather. Exposure to cold rains is especially damaging to them, particularly if their wool becomes wet to the skin. Shelter is also needed if the weather is cold when the lambs are born.

Lambs are decidedly more popular than sheep as a meat product in the United States. The lambs are sold when they are from 4 to 10 months old and at live weights ranging from 65 to 90 pounds. Lambs are popular because they are toothsome and yield the size of chops and roasts most desired by American consumers.

From the standpoint of numbers and improved methods of breeding and feeding, the leading sheep countries of the world are Australia, New Zealand, United States, Argentine, South Africa and Great Britain. There are a great many sheep in Europe and Asia, but outside of a few European countries they are not well improved.

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SHEEP, Mountain, a general term for the wild sheep of the world, which collectively form a group of romantic interest, and scientific importance. Excepting their perpetual rivals, the wild goats and ibexes, they are, of all land animals, the boldest and most active rock climbers, and the most partial to mountain scenery. Wherever found, they inhabit the highest and most rugged and picturesque situations. Strange as it may appear, the haunts of the Rocky Mountain big-horn include not only our loftiest mountain ranges and many wild tracts of "bad lands," but also the rocky walls of the great abyss known as the Grand Cañon of the Colorado. It is not strange, therefore, that all big-game hunters who love grand scenery find great fascination in the chase of wild sheep. No man worthy of the name of sportsman ever kills a ewe, but the head of an old ram, adorned with massive circling horns, won by dangerous mountain climbing and fair stalking, is a trophy of which any man may justly be proud.

It seems highly probable that the first wild sheep were developed in south-central Asia, in the region of the Altai Mountains, western Mongolia. At all events, the favorable conditions there obtaining have developed the great Siberian argali (*Ovis ammon*), whose enormous horns are a perpetual wonder to all who behold them. Near by in the Siar Mountains is found the Siar mountain-sheep. A comparatively short distance southward in Tibet is the Marco Polo sheep (*Ovis poli*), characterized by the enormous spread of its horns. A pair of horns of *Ovis poli* owned by Lord Roberts has a spread between tips of 54½ inches, and the longest horn measures 75 inches in length on the front curve. Southward of the range of the *Ovis poli*, in northern India, occurs the Punjab wild sheep, and the beautiful burrhel or blue sheep, both of them small species. Southwestward of Asia only two wild sheep are found, the small but handsomely colored mouflon of Corsica and Sardinia, and the large Barbary wild sheep or aoudad of the mountains of the Barbary states of North Africa. Northward from the home of *Ovis ammon* we find the Kamchatkan sheep, a species with horns like our white sheep, but otherwise exhibiting a strong resemblance to our big-horn. And this brings us to Bering Strait.

North America contains a really fine series of mountain-sheep species almost covering the mountainous regions of Alaska, and extending down the Rocky Mountain system to the region of Lake Santa Maria (lat. 30°) in northern Mexico. In addition to this, a species known as Nelson's mountain sheep branches off in southwestern Nevada, extends through southern California and on down the peninsula of Lower California for two-thirds of its length. The total area of North America inhabited by mountain sheep is about 3,500 miles long from north to south, and its greatest width from east to west, which is found in Alaska, is more than 1,000 miles. Of North American mountain-sheep, there are three conspicuous and well-marked types, and three offshoots. When diagrammed in a manner calculated to appeal to the eyes they stand as follows:

TYPES	OFFSHOOTS
Big-Horn (*Ovis canadensis*)	Nelson's Sheep (*Ovis nelsoni*) Mexican Sheep (*Ovis mexicanus*)
Black Sheep	(*Ovis stonei*)
White Sheep (*Ovis dalli*)	Fannin's Sheep (*Ovis fannini*).

The Rocky Mountain big-horn (q.v.) has been known since 1803, and is our most widely known species. All the others are of recent appearance, only the white sheep dating back as far as 1884. The range of the big-horn extends from lat. 55° and long. 120° to San Francisco Mountain, Arizona. It embraces the whole main range of the Rockies between those points,

and also includes the Fraser River country, one locality in northern Washington, two in eastern Oregon, the counties of Custer and Dawson in Montana, the Black Hills and Bighorn Mountains of Wyoming, four localities in Utah, and the Grand Cañon of the Colorado.

This is the largest and heaviest species of our *Ovis*, and carries the most massive horns. It reaches its maximum development in the main range of the Rocky Mountains in western Alberta. A large ram stands 40 inches in height at the shoulders and weighs about 325 pounds. Horns that measure 16 inches in basal circumference may justly be called very large. The largest and longest on record measured 18½ inches in basal circumference, and 52½ inches in length on outer curve, but the genuineness of this pair of horns is now doubted. One of the largest pairs in existence measures 16½ inches in basal circumference, 40½ inches in length and weighs 38 pounds. Apparently the horns of a mountain-sheep grow as long as the wearer survives in a healthy condition.

Wild sheep are not covered with wool like domestic sheep. Next to the skin is a coat of fine woolly hair, which is for warmth; but through this grows a coat of long, coarse hairs, large in diameter, pithy within and easily broken. This does duty as a rain-coat, and it also gives the animal its distinctive color. In summer, or late spring, when the old pelage is shed, the new coat is only half an inch in length, and the wild sheep stands forth fully sheared by the hand of nature. At that season the skin is worthless as a trophy. Mountain-sheep are at their best in October, November and December, and should be hunted at no other time. The lambs are born in May, and usually there is but one at a birth. Owing to the practical impossibility of keeping mountain-sheep of any American species alive in captivity, anywhere east of the Great Plains until they reach full maturity, our members of the genus *Ovis* are but little known to the general public, and consequently are quite unappreciated at their true value.

The white mountain-sheep of Alaska was not introduced to the world until 1884. It inhabits nearly all the mountainous regions of Alaska except the Alaska Peninsula, the valley of the Kuskoquim and the lower valley of the Yukon. Until recently it has been quite abundant on the Kenai Peninsula and around the head of Cook Inlet. This animal is all over pure white, and its winter pelage is long and abundant. It is smaller than the big-horn, and its horns never exceed 15½ inches in circumference. Northward its range extends almost to the Arctic Ocean, and its southern limit is found at lat. 58°. In 1901, the New York Zoological Society sent a collector to Cook Inlet to capture newly-born lambs of this species, and bring them to New York, for acclimatization in the Zoological Park. Three lambs were captured, but they proved to be such delicate feeders that all died within a few days of their capture.

The black mountain-sheep was discovered in 1896 in northern British Columbia, and good representatives of this species are to be seen in the museums of New York, Chicago and Washington. The size of the black sheep is the same as that of *Ovis dalli*. The species is characterized by the wide spread of its horns, and the very dark color of its pelage, all except the white of the rump-patch and the abdomen. So far as known the range of this species is very circumscribed, for it has not been reported outside of a small area in northern British Columbia.

Fannin's mountain-sheep, often called the «saddle-backed sheep,» was discovered on the Klondike River near Dawson City in 1900. It is an offshoot of the white sheep, and may possibly be the result of cross-breeding between that species and the black sheep. Its back, sides and tail are bluish gray, and a brown band extends down the front of each leg; but all other parts of the animal are pure white. Its horns are like those of the white sheep. But little is known of the range of this species.

The Mexican sheep and Nelson's sheep are both offshoots of the big-horn. They are short-haired and large-horned, and their prevailing color is pale salmon gray.

Wherever they are not fully protected by law, all species of American mountain-sheep are sought for and killed, by hunters for sport, and by natives for food. The total number remaining is small, and it is impossible for the survivors to be protected too rigidly. The big-horn quickly learns the value of protection, and the herd in the Yellowstone Park has rapidly increased and become so tame that it permits visitors to approach within 30 paces. Consult Baillie-Grohman, 'Camps in the Rockies' (London 1882); Grinnell, G. B., 'Hunting at High Altitudes' (New York 1913); Hornaday, W. T., 'Campfires on Desert and Lava' (New York 1908); id., 'Our Vanishing Wild Life' (New York 1913); Lyddeker, 'Wild Oxen, Sheep and Goats' (London 1898); id., 'Fifteen Years' Sport and Life in Western America' (London 1900); id., 'The Sheep and Its Cousins' (London 1912); Mayer (ed.), 'Sport With Gun and Rod' (New York 1883); Roosevelt, T., 'Hunting Trips of a Ranchman' (New York 1885); Stebbing, E. P., 'Stalks in the Himalaya' (London 1912); Whitney, C., and others, 'Musk-Ox, Bison, Sheep and Goats' (New York 1904).

SHEEP-BOT, a bot-fly (q.v.) whose maggots produce the disease of sheep called «grub in the head.» See SHEEP.

SHEEP-DOG. See COLLIE; DOG.

SHEEP-EATERS. See SHOSHONEAN INDIANS.

SHEEP-LAUREL, or **LAMB-KILL,** the *Kalmia* or mountain-laurel (q.v.), which is poisonous to lambs and other small animals.

SHEEP TICK, or **LOUSE.** See SHEEP.

SHEEPSHEAD, the name of an important food fish (*Archosargus probatocephalus*) of the family *Sparidæ*. It is a stout, deep-bodied fish, with seven or eight vertical dark bands, and may attain a length of 2½ feet and a weight of 15 pounds. It receives its name from the resemblance of its teeth to those of a sheep, having incisor-like ones in the front of the mouth and molars behind. It is found along the coast from Cape Cod to Texas and is abundant locally and especially southward wherever the conditions are favorable. Like the drumfish, the sheepshead feeds chiefly upon hard-shelled mollusks and crustaceans, and large numbers congregate where such food is plentiful and often prove destructive to oyster-beds. For boiling and similar methods of cooking it is considered superior to any fish in our waters, and consequently has a considerable commercial importance. The sheepshead is also a great favorite with anglers, many of whom are attracted to Florida fishing grounds in its pursuit. They are captured on extra stout lines and hooks baited with clam or soft-shelled crab and usually make a gallant fight before being finally landed in the boat. The fresh-water drumfish (q.v.) is also called sheepshead. Consult Jordan, D. S., 'American Food and Game Fishes.'

SHEEPSWOOL. See SPONGE.

SHEERNESS, shēr-nēs, England, a seaport and garrison town in the county of Kent, on the Medway River where it joins the Thames, 35 miles southeast of London. It is strongly fortified and has an excellent harbor. There are spacious dock-yards, used for making repairs, and which employ very many hands. The barracks accommodate several thousand soldiers and sailors. Sheerness-on-Sea is the modern town bordering the shore; the other divisions are Marinetown (a summer bathing resort), Miletown and Bankstown. Sheerness has a fine beach, broad esplanades and splendid bathing and boating. Charles II established the first dockyard here. In 1667 the town was captured by the Dutch admiral De Puyster. Pop. 17,500.

SHEERS, an engine used for hoisting masts and spars in shipbuilding and rigging. It consists of two or more poles or spars fastened together near the top and having their lower ends apart, somewhat in the shape of a narrow A. The apparatus is raised on a slant and is steadied by guy ropes, the base being fastened to the dock or ship on which it is used. From the top depends the tackle necessary for hoisting. Sheers are used on ships, docks and about shipyards for lifting heavy weights, guns, boilers or other machinery, spars and masts. When a mast is to be stepped or to be taken out, the sheers are mounted straddling the ship with the two base ends lashed to the deck on either side and the whole structure slanting so that its top is over the mast to be lifted or over the place into which it is to be dropped. Sheers used to be mounted on an old hulk or a ship cut down at one side so as to receive them; such vessels were called sheer hulks. They are little used in modern shipbuilding, their work being performed by permanent sheers on the docks or by the electrical cranes in the shipyards.

SHEET, generally speaking, a broad, flat surface; specifically a large stretch of water or ice; a large flat portion of some substance whose thickness is insignificant compared to its length and breadth, as a sheet of metal, of cardboard, etc.; a large rectangular piece of linen or like material used to cover the body during sleep, and thus a portion of the clothing of a bed; as applied to stationery, a large piece of paper either folded or unfolded; nautical, a sail, also the rope attached to the clew of a sail. There are some substances to which the name sheet is not applied. Thus we speak of a board and not of a sheet of wood, no matter how broad, flat and thin it is; we do not speak of a level field as a sheet of ground, although we would speak of a pond in the field as a sheet of water; neither do we say a sheet of glass (except rarely) but a pane. The compound sheet-glass, however, is commonly used. As applied to paper sheets follow two nomenclatures. Blank sheets of the stationers' trade are known by arbitrary names given to certain sizes, such as cap, legal cap, royal, demi-royal. But printed sheets are denoted, as to size, by an ancient system of Latin nomenclature, based on the number of folds required to bring to that size a sheet of certain dimensions. Thus a quarto is a sheet made of four folds, an octavo of eight, a duodecimo of 12, etc. (See BOOK). From this idea of a folded, printed piece of paper a newspaper is often called a sheet, so, also, the leaves of books before bound, when the book is said to be «in sheets.» A sail is called a sheet because it is made from a sheet of canvas and because it is broad, flat and thin. The rope called a sheet (abbreviated from sheet-rope) is used to hold a sail tight, extended against the wind, or to haul it around and change its position. This sheet is sometimes a chain.

SHEFFIELD, shĕf'ēld, **Joseph Earle,** American merchant and philanthropist: b. Southport, Conn., 19 June 1793; d. New Haven, Conn., 16 Feb. 1882. In 1813 he became a partner in a New York mercantile house, but subsequently removed to Mobile, Ala., where he acquired large interests in the cotton trade. From 1835 he was resident at New Haven, where he helped to obtain the charter for the New York and New Haven Railway, visiting London to secure the co-operation of capitalists. He also built the Chicago and Rock Island line. By his gifts and bequests of more than $950,000 the scientific department of Yale, since known as the Sheffield Scientific School, was reorganized and enlarged. See YALE UNIVERSITY.

SHEFFIELD, Ala., city in Colbert County, on the Tennessee River and on the Louisville and Nashville, the Northern Alabama and the Southern railroads, about two miles west of Tuscumbia (q.v.), the county-seat, and opposite Florence. Sheffield is one of the new cities of the South, founded in 1884 as a result of the great manufacturing movement. It is in an agricultural region in which there are large deposits of iron ore. There are five large blast furnaces, machine shops, cotton gins, cotton compresses and a grist-mill. There are several churches, a high school, public graded schools and several private schools. Pop. (1920) 6,682.

SHEFFIELD, England, city in the county of York, West Riding, at the junction of the Sheaf and the Don rivers, on several slopes surrounded by wooded hills. The suburbs are attractively built, with many terraces and elegant residences. There are a great number of churches, chief of which is the parish church erected under the reign of Henry I, which contains some interesting monuments; Saint Paul's, a good specimen of the Grecian; Saint James'; Saint George's; Saint Philip's and Saint Mary's, having exterior ornamentations of gargoyles, etc., and a graceful interior with a lofty and richly groined roof. The other buildings include the town-hall, council hall and municipal offices, Corn Exchange, Norfolk Market, Theatre Royal, Athenæum, libraries, association

halls, Mechanics' Institute, Albert Hall, Music Hall, Saint George's Museum, the Mappin Art Gallery and various others. The barracks are surrounded by extensive grounds. There are numerous hospitals and several monuments. Of educational and literary institutions the principal are Firth College; Wesley Ranmoor Methodist and People's College; grammar-school, public schools, art school, technical school; literary and philosophical institutions and museums. The University of Sheffield was founded in 1905 and is attended by over 1,500 students. The town enjoys all modern improvements. There are extensive botanical gardens. The Sheffield cutlery is celebrated, and all its manufactures of steel are famous, including heavy steel branches, such as armor plates, rail, large castings for engines, steel for rifles, etc. The other industries include the manufacture of optical instruments, iron and brass foundries, various mills, etc., besides silver plating, bicycles, cabinet-work, tanning, etc. Sheffield was in early times a Roman station and was an incorporated town under the Anglo-Saxons. In the 14th century it was already noted for its cutlery. Its history is also connected with the persecutions in the Netherlands, having been the refuge of victims suffering persecution under the Duke of Alva, who introduced their mechanical skill into the country. It developed rapidly in the 19th century, and became one of the greatest manufacturing cities of England. It was the first city of England to operate its street railway system. The electric-lighting and power plant, markets, artisans' dwellings, baths, free libraries, are also owned by the municipality. It sends five members to Parliament. Pop. 454,632. Consult Gatty, 'Sheffield, Past and Present' (London 1873).

SHEFFIELD PLATE. Of late years there has been a great interest in old Sheffield plate, which is now practically a lost art. Collectors pay large sums for specimens, which, a couple of decades ago, could be purchased for the proverbial "song." Some connoisseurs prefer the peculiar lustrous quality that the mixture of copper and silver gives to silver itself; others are charmed by the models produced in this special ware. Notwithstanding the fact that many old families possess a few specimens of Sheffield plate, comparatively few persons know much about it, for the question has been little studied. At the present moment the collecting of Sheffield Plate has become something of a fad and "antique" shops tempt the buyer with real and spurious articles.

Old Sheffield Plate is a term used to describe articles of flat or hollow ware for table or domestic use made of copper coated with silver by fusion. In Sheffield Plated Ware the silver was laid on both sides of a sheet of copper, something like a sandwich with the copper in the middle, and the two metals, united by fusion, were then hardened by pressure between rollers. Hence its old name of "Copper Rolled Plate," which describes it exactly. Sheffield Plate appears as a new invention in England in the year 1742; but it is more than likely it was a rediscovered process, for the art of imitating silver had reached a state of excellence in the 15th century. The art of imitating gold and silver was known to ancient nations. Assyrians, Egyptians and Hebrews were most skilful in the use of metals and in fine wire-work. The Romans left definite instructions regarding the application of gold and silver to articles of tin or copper and copper vessels coated with silver have been found at Herculaneum. The ancient Mexicans and Peruvians also made imitations of gold and silver and articles have been found in Peru that are silver plated on copper by a process very like that of Sheffield plating — the two metals having been amalgamated by heat. Sheffield Plate, or, to speak more correctly, Sheffield Plated Ware, dates from about 1743 and lasted for 100 years until it was superseded by electro-plating about 1840. Sheffield in the reign of Queen Elizabeth was famed for its cutlery and also the fine parks, gardens and country-seats in its vicinity. Sheffield is now a place full of dirt and smoke, caused by the factories and iron and steel works. In 1742 Thomas Bolsover, a mechanic, was repairing the handle of a knife, which was composed partly of silver and partly of copper, when he accidentally fused the two metals. This showed him that it was possible to coat copper with silver in such a way as to form a cheap and durable metal presenting an exterior of silver only. He immediately began to manufacture articles of this kind (copper plated with silver), but he confined his efforts to small objects, such as buttons, snuff-boxes and other light and small articles. Then Joseph Hancock took up the business and began to imitate the finest and most richly embossed plate. Thus every kind of domestic article that had decorated the sideboard and buffet, which until then had been made of wrought silver only, was imitated in copper Rolled Plate.

Naturally, the new process was hailed with delight by the middle class, for it was possible now for people of ordinary means to have shining Sheffield Plated Ware who had heretofore contented themselves with pewter. The trade developed to such an extent that it was difficult to fill the orders that came from all parts of England and her colonies. The new process was also carried to Birmingham, London, Nottingham, Scotland and Ireland. Dublin became quite a centre for the new manufacture. Sheffield plate was also made in America.

The Sheffield manufacturers produced tea-urns, coffee and tea-pots, tea-kettles and lamps, epergnes, tankards and measures of all sizes, jugs, cups, goblets, tumblers, candlesticks, candelabra with branches, cruet frames, water and platter plates and dishes, dish-rims, crosses, tea-trays and waiters, bottle-stands, writing-stands, tureens, ladles, spoons, scallop-shells, canisters, mustard-pots, argyles, snuffer-trays, wine-funnels (round and oval), salt-cellars, bottle-labels, decanter-labels, cream-labels, bread and sugar baskets, skewers, lemon-strainers, cheese-toasters, chocolate pots, saucepans, stewpans, snuff-boxes, bridle bits, stirrups, buckets, spurs, knife and fork handles, buttons for saddles and many other small articles.

Horace Walpole, writing in 1760, says: "As I went to Lord Stafford's I passed through Sheffield. One man there has discovered the art of plating copper with silver. I bought a pair of candlesticks for two guineas; they are quite pretty." Classification is difficult because the dealers have, unfortunately, divided up Sheffield in a way rather misleading to the historian and art-critic. Dealers have named the first examples of Sheffield "Queen Anne," which is absurd, because Sheffield plated ware began in the reign of George II. However, as dealers' names appear in catalogues of auction sales, etc., it is well to understand that what they mean by Queen Anne is applied to designs of the Queen Anne type, rather short and squat models in which the gadroon is the chief ornament. Dealers divide Sheffield plated ware into five periods: (1) Queen Anne; (2) early Georgian; (3) late Georgian; (4) Empire; and (5) Late. Sheffield Plated Ware followed all the styles that the silversmith introduced. Consequently the early and late Georgian show Louis XV and Chippendale styles and Louis XVI designs. The third period, from 1770 to 1785, is the most attractive of all because of the delicate and slender oval and the charming style of Adam, Heppelwhite and Sheraton ornamentation. Next comes the Empire style; and, finally, the last period, which is ornate and florid; but not by any means to be despised, because very splendid things were produced. The wire-work dates from 1790 to 1810. The perforated pieces come later. As a rule, the borders are of solid silver. In the earliest pieces the edge consists of a solid silver thread, or several threads; then comes the gadroon (or fluted) edge; then the gadroon and shell; and then the florid. Sheffield Plated Ware was often beautifully engraved.

Collectors should notice the difference between "Old Sheffield Plated Ware" which is silver-plated copper, and modern Sheffield Plated Ware, which is copper electro-plated. Counterfeit articles are made of copper and electro-plated.

Two or three points form a good test of the genuineness of old Sheffield Plate. One is the presence of embossed relief work of solid silver on all ornamented articles. Another test is the bands or narrow strips of silver to be found wrapped round the edges and under the mounts, which are put there to conceal the joints and bare edges of the copper. Another reliable test is the inlaid shield.

Nothing was hall-marked until 1784. Manufacturers also had special devices, viz., W. and G. Sissons, a bell; Watson, an open hand; Fenton Creswick and Company, crossed arrows; Boulton Bingham, ball and horseshoe; Walker Knowles and Company, ball and cross; Daniel Hoyle and Company, pineapple; Wilkinson and Company, cross keys, and so on. The chief authority is Bradbury's 'History of Old Sheffield Plate' (London 1912). Consult also Veitch, H. N., 'Sheffield Plate' (London 1908); and Wylie, Bertie, 'Sheffield Plate' (London and New York 1907).

ESTHER SINGLETON.

SHEFFIELD SCIENTIFIC SCHOOL, a department of Yale University. See YALE UNIVERSITY.

SHEIK, shēk, an Arabic word signifying an aged man or elder, is used generally as a title of reverence and has come to acquire a great variety of significations. Among the Bedouins and other migratory tribes where patriarchal government prevails, the head of every tribe is called a sheik. The superiors of the Mohammedan religious or monastic orders are called sheiks. The chief mufti is called sheik-ul-islam. In general the title is given to learned men, and by a wider extension is used as a common title of courtesy, like Mr.

SHEIL, shēl, **Richard Lalor,** Irish orator, dramatist and politician: b. Drumdowney, 17 Aug. 1791; d. Florence, Italy, 25 May 1851. He was educated at Stonyhurst College and Trinity College, Dublin, studied law at Lincoln's Inn and was called to the bar in 1814. His progress in his practice was slow and he turned to dramatic writing, having already produced a moderately successful drama, 'Adelaide' (1814). A tragedy, 'The Apostate,' was produced in 1817, and ran through the season. He produced 'Bellamira, or the Fall of Tunis' (1818); 'Evadne' (1819); 'The Huguenot' (1822), and with John Banim, 'Damon and Pythias.' Of these 'Evadne' is considered the best. He next joined with Curran in contributing to the *New Monthly Magazine* the 'Sketches of the Irish Bar.' In 1825 he visited London with O'Connell, O'Gorman and others to protest against the bill that had been introduced for the suppression of the Catholic Association, and during the progress of the agitation continuing until 1829 spoke many times in public meetings in Ireland in behalf of the Irish cause. When emancipation was finally secured, Sheil moved the dissolution of the Catholic Association. In 1830 he entered Parliament from Milbourne Port in Dorset, sat for County Louth in 1831 and in 1833 was member of the first reformed Parliament for County Tipperary. He gradually withdrew from a close identification with the Irish cause and turned his attention more to the foreign policies of the empire. Shortly after the accession of William IV he became commissioner of Greenwich Hospital, but later exchanged this post for the vice-presidency of the Board of Trade. In 1846 he was appointed master of the mint and his inability to move in the relief of the famine in Ireland, though not thoroughly understood in that country, yet diminished his popularity. His last appointment was that of Minister to the court of Tuscany in 1850. He was brilliant in Parliamentary speaking, though he lacked spontaneousness, and carefully prepared each address. Of his forensic speeches that delivered as counsel for John O'Connell at the "monster trials" in Dublin in 1844 is accounted his best. His 'Speeches' was edited by McNevin (Dublin 1845). Consult McCullagh, W. T., 'Memoirs of Richard Lalor Sheil' (London 1855).

SHEKEL, a unit of weight supposed to have been first used in Babylonia and afterward by the Jews and other peoples; also a coin used by the Jews and thought to have been introduced by Simon Maccabæus. The weight was reckoned as one-sixtieth part of a maneh, and afterward was revised by the Phœnicians to be one-fiftieth part of a maneh (then called mina). It is probable that the shekel, with other measures of weight, underwent much revision as to size, shape and weight. Phœnician shekels are found in the following weights: 234 grains (Troy), 224 grains, 218 grains, 208 grains. The Assyrian shekel was of 129 grains; their double shekel of 258 grains. The Jewish shekel was of 218 grains.

The use of the shekel as money among the ancient Hebrews is popularly supposed to date with Simon Maccabæus, to whom was given

(1 Mac. xv, 5) the power "to coin money for thy country with thine own stamp." Whether or not Simon made use of this privilege is disputed by some authorities, but it is generally conceded that either he or his son coined the first native Hebrew money. This was about 141 B.C. The shekel seems to have been of gold, copper or silver, and originally of a shekel in weight. The gold shekel was worth about $5.69, the copper about three cents and the silver shekel about 54 cents. The silver shekel seems to have been the most used. A common example of it shows on one side a pot of manna, or sacred bread, with the legend "shekel of Israel"; on the reverse a flower figure, supposed to have been a representation of Aaron's rod budding, and the legend "Jerusalem the holy." The shekel of the sanctuary (Ex. xxx, 13) or temple tax was supposed, for a long period, to have been a special coinage, but it is now believed to have been the silver shekel of the country. Consult article "Money" in Hastings' 'Bible Dictionary' (New York 1900); Madden, F. W., 'Coins of the Jews' (London 1881); Reinach, T., 'Jewish Coins' (1903).

SHEKINAH, shē-kī'na, a post-Biblical abstract term, signifying "he who dwells," from the Biblical *Shakan,* to dwell, employed as a substitute for God to avoid certain anthropomorphic words in the Bible. It is used particularly in such passages where God is mentioned as dwelling either in the tabernacle or among the people, to express the majesty of the divine presence. It was used primarily to soften terms applied to God and to prevent by a kind of periphrasis false views as to His manifestations in the popular mind. At the root of its employment was the innate antagonism of the Israelite to any materialistic conception of the divine. It is found most frequently in the Targumim or Aramaic paraphrases of the Old Testament, written when Hebrew had ceased to be the popular language.

A few illustrations will make the usage clear. The Targum of Onkelos renders the sentence (Ex. xxix, 45) "And I will dwell among the children of Israel and be their God," as "And I will cause my Shekinah to dwell." In Isaiah (xxxiii, 17), "thine eyes shall see the King in all His beauty" became "Thine eyes shall see the Shekinah of the King of the worlds in His beauty." Onkelos translates "Elohim" in Gen. ix, 27 by "Shekinah" or whenever the person, dwelling, radiant majesty of the divine is mentioned. Even the temple of Solomon is called "the house of the Shekinah," which also took the place and meaning of the Aramaic *Memra* "name," *logos* and *Yekara,* "glory" in Talmud and Midrash. It is employed, too, in the New Testament — the Greek word for "glory" *doxa* being regarded as equivalent to Shekinah. G. H. Box gives as the most notable passage Romans, ix, 7, where Paul, mentioning the privileges of Israel, states "whose is the adoption and the glory," the visible presence or Shekinah of God among His people.

As to the nature of the word, it sprang into usage in a polemical era. Rabbinical opinions have not been unanimous. Schechter seems to regard as unfortunate the attempts of the rabbis to allegorize in the days of other and more aggressive philosophies. "What to and rabbis was a simple adjective, a reverential expression, or a poetical metaphor turned into the hands of the Hellenists into a new deity an aeon, or a distinct Emanation," as he writes in 'Some Aspects of Rabbinic Theology' (p. 43). In later centuries Maimonides in his 'Guide to the Perplexed,' which sought to interpret the law of Moses by the logic of Aristotle or to coordinate both philosophies, considered the Shekinah as a distinct entity, a light proved to be intermediary between God and the world. On the other hand, Nachmanides deemed it the essence of God manifested in a distinct form. An attempt has been made by Weber to differentiate the Talmudic from the Targumic conception of the Shekinah but without success. The difficulty of an exact definition is due not only to the fact that diverse ideas have been associated with it, but to the circumstance that in rabbinical literature, extending over many centuries, the utmost freedom of opinion is exercised and full citations must be given to understand aright their views. In their homiletical interpretations in particular the rabbis were rich and naïve in fancy.

Bibliography.— Bähr, 'Symbolik des Mosaischen Cultus'; Etheridge, 'The Targums on the Pentateuch'; Schechter, 'Some Aspects of Rabbinic Judaism'; Schürer, 'History of the Jewish People'; Taylor, 'Sayings of the Jewish Fathers' (3d ed., p. 43); Weber, 'Jüdische Theologie.'

ABRAM S. ISAACS.

SHELBURNE, shĕl'bĕrn, **William Petty Fitzmaurice,** LORD, 1st Marquis of Lansdowne: b. Dublin, 20 May 1737; d. London, 7 May 1805. He entered Oxford, but two years later left the university and entered the army. While engaged in the campaign in Germany he was returned to the House of Commons for High Wycombe in 1760, and was re-elected in the following year. He was also elected to the Irish Parliament, but he never sat in either body, for the death of his father in 1761 elevated him to the House of Lords. He was frequently employed by Butte as a negotiator in political combinations and on 30 April 1763 he became president of the Board of Trade and Foreign Plantations with a seat in the Cabinet; but his speech in the debate on the proceedings against Wilkes caused his dismissal from his staff appointment. In April 1764 he took his seat in the Irish House of Lords as Earl of Shelburne, and in 1766 took a leading part in the English Parliament in the repeal of the Stamp Act. Under Pitt he became Secretary of State for the Southern Department (23 July 1766), and in the following month the entire control of the administration of the colonies was placed in his hands. He endeavored to pursue a conciliatory policy toward the American colonies, but in this was thwarted by his colleagues, and in January 168 was superseded by Lord Hillsborough. He stood alone with Chatham against coercing the American colonies, but his opposition was unavailing. In his Parliamentary speeches, many of which became famous, he always opposed the coercive measures of Lord North's ministry, recommended measures for ending the hostilities in America, but declared he would never consent to the acknowledgment of American independence. When Lord North resigned in March 1782 Shelburne declined the king's invitation to form a new ministry, but acted as intermediary in pressing the post upon Rockingham. In the Cabinet formed by the latter he became Secretary of State for Home Affairs, and tried to introduce several economic reforms. Rockingham's death occurred in July of that year and Shelburne accepted the duty of forming a government. In this ministry William Pitt, then only 23, became Chancellor of the Exchequer. In the debate on the change of ministry Shelburne declared that he still adhered to all the constitutional ideas that he had imbibed from his master in politics, Lord Chatham, and that he had not altered his opinion concerning American independence; but during the negotiations of the Peace of Paris he was reluctantly led to agree to the concession. The coalition of North and Fox against his government led to his resignation 24 Feb. 1783. In December 1784 he became Marquis of Lansdowne in the English peerage. He was one of the most hated men of his time, a circumstance probably due to his independent spirit in party politics and his supercilious manners. Yet many of his views were more enlightened than his times. He advocated Parliamentary and economic reform, Catholic emancipation and religious equality and free trade. Disraeli said he was "the first great minister who comprehended the rising importance of the middle class." He patronized literature and the fine arts and his later years were largely devoted to his collection of books and pictures. Consult Fitzgerald, 'Fitzmaurice, Life of William, Earl of Shelburne' (1875–76; revised ed., London 1912).

SHELBURNE, Canada, capital of Shelburne County, Nova Scotia, a seaport town on the southwest coast at the head of a deep and capacious bay, forming one of the safest harbors of the province, 140 miles southwest of Halifax. Shelburne is a station on the Inter-Colonial Railway system and has an important maritime and transit trade. Ship-repairing docks and ironworks are the chief industrial establishments, and its fisheries are valuable. The Roseway River supplies abundant water-power. The entrance to the harbor is marked by a lighthouse on McNutt's Island; it exhibits two lights, the highest 120 feet above the sea. After the American Revolution the population of Shelburne was increased to about 12,000 by the advent of United Empire Loyalists. It has since declined in importance.

SHELBY, Isaac, American soldier: b. North Mountain, Md., 11 Dec. 1750; d. Traveller's Rest, Lincoln County, Ky., 18 July 1826. He became a surveyor and in 1771 removed to Tennessee. In 1774 he was appointed lieutenant in the company of his father, Gen. Evan Shelby, fought at the battle of Point Pleasant and remained in command of the fort there until 1775. He was engaged at the battle of Long Island flats where his valor won the day, became commissary of the frontier in 1777 with rank as captain, in the succeeding year was promoted colonel, and also served as a member of the Virginia house of delegates in that year. He planned the important action at King's Mountain in 1780, served under Marion in 1781 and under Greene in 1781–82, and was a member of the North Carolina legislature in those years. He was a member of the Constitutional Convention in 1791 and was elected the first governor of Kentucky in 1792, served until 1796 and again in 1812–16. He recruited and led 4,000 men to the relief of General Harrison in Canada in the War of 1812, receiving a gold medal from Congress for his services. He declined the office of Secretary of War in 1817 and afterward lived in retirement, though he acted as commissioner with General Jackson in negotiating the treaty with the Chickasaw Indians in 1818. Nine counties in the Southern and Western States are named in his honor, as is also a college at Shelbyville, Ky.

SHELBYVILLE, Ill., city, capital of Shelby County, on the Kaskaskia River and on the Cleveland, Cincinnati, Chicago and Saint Louis and the Chicago and Eastern Illinois railroads, about 45 miles southeast of Springfield and 33 miles south by east of Decatur. It is in a fertile agricultural region in which considerable attention is given to stock-raising, lumbering and coal-mining. The chief manufacturing establishments are flour-mills, foundry, lumber-mills, agricultural implement works, gasoline engine manufactories, a woolen-mill and creameries. There is considerable trade in farm and dairy products, livestock and coal. Pop. 3,590.

SHELBYVILLE, Ind., city, county-seat of Shelby County, on the Big Blue River and on the Cleveland, Cincinnati, Chicago and Saint Louis and the Pittsburgh, Cincinnati, Chicago and Saint Louis railroads, about 26 miles southwest of Indianapolis and 90 miles north of Louisville, Ky. It is in an agricultural and stock-raising region. The chief manufacturing establishments are 18 furniture factories, flour-mills, creameries, barrel factories, lumber and planing-mills, paper products mill, glove factory and fireless-cooker plant. It is the commercial and industrial centre for Shelby County and has considerable trade in farm and dairy products, livestock and manufactures. There are 12 churches, 10 public schools and one parish school and a public library. The three national banks have a combined capital of $300,000; there are several building and loan associations and one private bank. The city has had a steady growth, mainly due to the general development of the surrounding country. Pop. (1920) 9,701.

SHELBYVILLE, Ky., city, county-seat of Shelby County, on the Southern and the Louisville and Nashville, and the Chesapeake and Ohio railroads, about 28 miles east of Louisville and 21 miles west of Frankfort. It is in an agricultural and stock-raising region. Shelby County is known as the Jersey Isle of America, on account of the large number of blooded Jersey cattle. Large quantities of tobacco in the vicinity are prepared for market and shipped from Shelbyville. It has a flour-mill, creameries, machine shops and cigar factories. The educational institutions are a high school, elementary schools, Science Hall School for Girls, Stuart Female College, founded in 1839, Shelbyville Academy for Boys, opened in 1881. Five banks have a combined capital of $425,000. The government is vested in a mayor and a common council. A sum of $85,000 will be expended by the government in a new post-office building. Shelbyville is one of the richest

counties in the State—has over 400 miles of macadamized roads. Pop. (1920) 3,760.

SHELBYVILLE, Tenn., town, county-seat of Bedford County, on the Duck River and on the Nashville, Chattanooga and Saint Louis Railroad, about 65 miles south by east of Nashville. In June 1863 the town was the scene of military operations and during the greater part of the Civil War Shelbyville and vicinity were scenes of many skirmishes. It is in an agricultural and lumbering region and in the vicinity are several varieties of good building stone. The chief manufacturing establishments are foundries, machine shops, lumber and planing mills, a large lead-pencil factory, cotton and woolen mills and a flour mill. The chief products shipped are pencil-cedar, telegraph and telephone poles, grain and mules. There are six churches, graded public schools and the Shelbyville Female College, founded in 1853. Pop. about 3,000.

SHELD-DRAKE, or **SHELDRAKE,** a sea-duck (*Tadorna cornuta*) of the cooler parts of the Old World, which frequents sandy shores and makes its nest in burrows in sand-dunes, earthen cliffs, old rabbit-warrens, etc. It is of large size and very handsome plumage; head and upper neck dark, glossy green, broad white collar below, with a broader band of bright bay extends from the back across the breast. It is somewhat larger than an ordinary duck and the female is smaller and less brilliantly colored. In the Frisian Islands and some other parts of the world the people provide it with acceptable artificial breeding-burrows and take a portion of its eggs and down, so making an annual profit from the arrangement. Several other species of the same genus are found throughout Africa, southeastern Asia and Malaya, one of which is well known in India as the Brahming duck. Much ornithological interest attaches to these birds and the name itself is a matter of curious speculation, for which see Newton, 'Dictionary of Birds' (New York 1896).

SHELDON, Charles Monroe, American Congregational clergyman and author: b. Wellsville, N. Y., 26 Feb. 1857. He was graduated from Brown University in 1883, from the Andover Theological Seminary in 1886, was ordained in 1886 to the Congregational ministry and in 1889 became pastor of the Central Congregational Church of Topeka, Kan. In 1900 he attracted considerable attention by his connection with the Topeka *Capital,* of which he took entire charge for one week, and which he published as a distinctively Christian daily after principles enunciated in his book, 'In His Steps' (1896), a work of excellent intention, but no literary importance, which was sold very extensively. Among other volumes by him are 'Robert Hardy's Seven Days' (1892); 'Malcolm Kirk' (1897); 'The Wheels of the Machine' (1901); 'The Narrow Gate' (1902); 'The Heart of the World' (1904); 'Richard Bruce,' 'The Reformer,' 'The Crucifixion of Philip Strong,' 'The High Calling,' 'John King's Question Class,' 'The Twentieth Door,' 'For Christ and the Church,' 'One of the Two,' 'His Brother's Keeper,' 'A Builder of Ships,' 'The Miracle at Markham,' 'Born To Serve,' 'Jesus is Here!' 'Of One Blood.'

'In His Steps,' "a work of excellent intention, but no literary importance," has been translated into 24 langauges and published by 100 different publishers who have sold 20,000,000 copies, with no pecuniary benefit to the author as the book was not copyrighted. In 1912 Mr. Sheldon resigned his pastorate of Central Congregational Church and became "Minister at Large." In 1915 he was recalled as pastor, and is now (1916) serving in that capacity.

SHELDON, Edward Brewster, American dramatist: b. Chicago, 14 Jan. 1886. He was graduated at Harvard University in 1907, and took his A.M. there in 1908. His first play, 'Salvation Nell' (1908), in which Mrs. Minnie Maddern Fiske starred, was written while he was pursuing post-graduate studies at Harvard. Author of 'The Nigger' (1909); 'The Boss' (1912); 'The High Road' (1912); 'Romance' (1913); 'The Song of Songs' (1914); 'Garden of Paradise' (1915), etc.

SHELDON, Edward Stevens, American philologist: b. Waterville, Me., 21 Nov. 1851. He was graduated at Harvard University in 1872, and later studied at the universities of Berlin, Paris and Leipzig. From 1877 he was connected with the modern languages and Romance philology departments at Harvard, and since 1894 he has been professor of Romance philology there. Author of 'A Short German Grammar' (1879), and joint author of 'Concordanza delle opere italiane in porsa e del canzioniere di Dante Alighieri' (1905).

SHELDON, Henry Clay, American Methodist Episcopal theologian and educator: b. Martinsburg, N. Y., 12 March 1845. He was graduated at Yale University in 1867 and at the Boston University School of Theology in 1871, was ordained and served as a pastor in 1871–74. He was professor of historic theology at the Boston University School of Theology in 1875–95, and thereafter was professor of systematic theology there. Author of 'History of Christian Doctrine' (2 vols., 1886; 4th ed., 1906); 'History of the Christian Church' (5 vols., 1894); 'A History of Unbelief in the Nineteenth Century' (1907); 'A Fourfold Test of Mormonism' (1914); 'Studies in Recent Adventism' (1915), etc.

SHELDON, Lionel Allen, American lawyer: b. Otsego County, N. Y., 30 Aug. 1831; d. 17 Jan. 1917. After studying at Oberlin College he was admitted to the bar in 1851, and began practice in Elyria, Ohio. In 1856 he was a delegate to the Philadelphia Republican Convention and there supported John C. Frémont as its nominee for President. In 1861 he was commissioned a brigadier-general of militia, and in that capacity raised many recruits for the Union army. He was made colonel of the 42d Ohio Infantry in 1862; won distinction in the battles of Chickasaw Bayou and Arkansas Post; and took part in the capture of Vicksburg. He was brevetted brigadier-general of volunteers in 1865. After the war he removed to New Orleans, where he practised law; was a Republican member of Congress in 1869–75; and governor of New Mexico in 1881–85.

SHELDON, Samuel, American electrical engineer: b. Middlebury, Vt., 1862. He was graduated at Middlebury College in 1885, and from the University of Wurzburg in 1888. He was assistant in physics at Harvard University in 1888–89, and since 1889 has been professor of physics and electrical engineering at the Brooklyn Institute of Arts and Sciences. In 1903 he was appointed an expert in the Swiss department of justice and police. Author of 'Dynamo Electric Machinery' (1900; 9th ed., 1915); and joint author of 'Alternating Current Machines' (1902; 9th ed., 1911), and 'Electric Traction and Transmission Engineering' (1911).

SHELIFF RIVER (French *Chéliff,* shā-lēf), Algeria, a river rising on the Atlas Range and flowing north into the Mediterranean Sea, which it enters near Mostaganem. It traverses the great central plateau, and then flows for a considerable distance westward, parallel with the coast, through a fertile longitudinal valley between the two coast ranges. It is 400 miles long, and the largest river in the colony.

SHELL. See PROJECTILES.

SHELL, the external limy, chitinous or silicious integument or covering of such invertebrate animals as form a hard exoskeleton; or some structure resembling the armor of a mollusk. Thus, broadly, the term applies to the protective envelope of eggs; the tests of foraminifers, polyzoans and echinoderms, the living tubes of annelids, the exoskeletal integuments of the crustaceans, the shards of beetles, and the egg-pouches and cuttle-bone of the argonauts and calamaries, as well as to the hard armor, or "shells" proper, brachiopods of mussels and snails. Whatever its form or homology, it serves the purpose of support and protection. The characteristic structure of the exoskeleton, tests and other "shells" of the invertebrates mentioned above are given in the articles on FORAMINIFERA, ECHINODERMATA, etc.; and the present treatise may be restricted to the shells of the *Mollusca.*

The shells of mollusks vary from entire absence, or a merely rudimentary condition, to highly elaborate and ornamental examples; and from almost microscopic minuteness and delicacy to massive structures completely enveloping and protecting the animal and weighing several hundred pounds. All are composed mainly of carbonate of lime, which in some cases, as the hard shells of the cameo-strombs, amounts to 99 per cent, while in others as much as 10 per cent may consist of other earthy salts, and a small amount of organic material called "conchiolin," which disappears as shells dry out after the death of their occupants. Various views have been held as to the formation of the shell, but it is plain that the mantle-margin is the principal agent in its deposition; accidental holes and breaks will be repaired elsewhere, and even the foot may secrete shelly matter, but regularly this is the function of the epithelial cells along the edge of the mantle, to separate the carbonate of lime from the blood and throw it out, where it crystallizes and cements itself into the required form as it exudes. This deposition is not continuous, but takes place at more or less regular periods or seasons, annually or semi-annually, alternating with seasons of rest. The additions to the shell made during each period of activity are often indicated by a thickened line forming a raised and more or less knobbed or irregular ridge called a varix. "The various details of sculpture on the exterior surface of the shell—the striæ, knobs, nodules, imbrications, spines and other forms of ornamentation are all the product of similar and corresponding irregularities in the mantle margin and have all been originally situated on the lip. Spines, for example, those of *Murex* and *Pteroceras,* are first formed as a hollow thorn, cleft down its lower side, and are afterward filled in with solid matter as the mantle-edge withdraws. What purpose is served by the extreme elaboration of these spiny processes in some cases, can hardly be considered as satisfactorily ascertained. Possibly they are a form of sculptural development which is, in the main, protective, and secures to its owners immunity from the attacks of predatory fishes." (Cooke, 'Mollusca,' p. 256).

Three principal varieties of texture are perceptible in molluscan shells. The porcellanous shells of gastropods consist of three layers, which consist of thin plates, placed side by side, the direction of the planes of these laminæ being different in the different layers. Thus the plates may lie transversely in the central layer and horizontally in the others, or longitudinally in the middle and crosswise in the outer and inner layers. The nacreous shells form the second variety made up of numerous closely packed layers, the edges of which exhibit undulations of their surfaces. The lustre and prismatic hues of nacre are due to the minute striæ on the surface which break up and refract the light. (See PEARL). It is interesting to note that the nacreous type of shell occurs largely among mollusks which now represent very ancient forms. The fibrous shells are composed simply of successive laminæ or layers of prismatic cells. In their living state shells are covered externally by a layer of animal matter, known as the periostracum, or epidermis, well seen in the fresh-water mussels, for example. This layer may, however, be so delicate as to be almost invisible to ordinary observation. The colors of shells are due to pigment deposited in the course of their growth from pigment cells situated along the mantle-margin. When the valves or pieces of which a shell is composed are equal in size the shell is denominated equivalve; if more developed to one side of the middle line than to the other it is termed inequilateral. The prominent point of the shell is the umbo or beak; this always points in the direction of the mouth, and hence the part on which the mouth is situated is termed anterior; the opposite posterior. The part where the hinge is situated is the dorsal or upper border; the border opposite to this or that by which the shell opens, the ventral side or base. The length of a bivalve shell is measured from its anterior to its posterior margin; and its breadth from the dorsal to the ventral border. The shells of bivalved mollusks (pelecypods) are shut or drawn together by the action of either one or two adductor muscles. The impressions or "scars" of these muscles may generally be perceived on the interior of the shells, but in some cases (as in oysters) only a single adductor muscle is developed, this latter representing the posterior muscle of those forms possessing two. The forms with single muscles are named *Monomyaria,* those with two being termed *Dimyaria.* These shells are opened not by muscular action but by that of ligaments situated at

the hinge, one of which (the external ligament) is put on the stretch when the shell is closed, and opens the shell in virtue of its elasticity. The internal ligament is situated within the hinge, and usually in pits or depressions of the shell. This latter is also compressed when the shell is closed, and aids in opening the shell by its elasticity. The hinge may be curved or straight, and may exhibit sets of teeth springing from one valve and fitting into sockets on the opposite valve of the shell.

In gastropods the shell is typically a spiral univalve; and we may conceive of a simple conical shell (such as that of the limpet) being converted into a spiral form by supposing it to be first long drawn out, and then twisted upon itself from above downward, either to the right or left side. The apex of the gastropod shell is usually more or less oblique in position. The coils or whorls of the spiral shell may either be separated (as in *Vermetus*) or contiguous, and in close contact. Sometimes the whorls lie in one and the same plane, being coiled round a central axis (as in the fresh-water *Planorbis*), and then the shell is named discoidal. But generally the gastropod shell shows the whorls to be wound in an oblique manner, so as to form a true spiral and shells with this conformation may, therefore, be named trochoid, turreted, turbinate, etc. An ordinary gastropod (or snail) shell shows the whorls wound round a central axis or columella; the nucleus or apex being formed by the shell of embryonic life, and the largest or terminal whorl (body whorl) showing the mouth or aperture, which may exhibit various dentations of its margins. When the columella or axis of the shell is hollowed, and opens below at the mouth-aperture, the opening is named the umbilicus; but it may also be solid and imperforate. If the aperture or mouth of the shell is notched for the passage of one or more siphons, the shell is said to be siphonostomatous. If, on the contrary, its margin is unbroken and entire, the shell is holostomatous.

The shells of *Pteropoda* are generally of delicate glassy structure, and consist either of a dorsal and ventral or united plate, or of a spiral shell. In some extinct forms (for example, *Conularia*) of Pteropoda the shell was of large size and of quadrate shape.

The *Cephalopoda* or cuttlefishes possess (as in the *Tetrabranchiata;* see NAUTILUS) external many-chambered shells, or, as in ordinary cases, internal shells, which may be destitute of chambers, or chambered as in the extinct *Belemnites* or in the existing *Spirula.* In the argonaut (q.v.), the shell is external, but single-chambered; and is, moreover, not a true shell, but a foot-secretion of the female only, formed not by the mantle but by two of the feet or arms, which are specially expanded and modified for this office; and the office of which is the safety of the developing eggs.

SHELL, Its Industrial Uses. It may surprise some to learn that shells rank among the principal "fishery" products of the world. This refers to those used for industrial purposes and not to the large supplies for museum and cabinet collections. In London the sales of pearl shells or mother-of-pearl amount to about $4,000,000 each year, and the annual imports of this material into the United States before the war exceeded $1,000,000 in value. The shells caught in this country aggregate about 1,000,000 tons annually. The economic utilization of these is more diversified than is generally supposed, giving employment to many thousands of persons, and constantly increasing in importance. The most valuable item in shell production is mother-of-pearl. The most important is the pearl oyster found in many inshore tropical waters of both continents. The shells vary greatly in color and iridescence, but three general classes are recognized, namely, white or silver-lipped, yellow or golden-edged and smoky or black-edged; the last yielding the so-called "smoked" mother-of-pearl.

The white shell has the silvery lining uniform over the surface, and as it may be cut up to greater advantage, it is the most valuable. When black pearl buttons are fashionable, the black-edged shell sells almost as high as the best white shell. A fair valuation of mother-of-pearl shells is $40 per ton, though the choicest sell for upward of $1,500 per ton.

During recent years large quantities of low-grade pearl shell have been secured from the fresh-water mussels of the United States. These occur principally in the Mississippi River from Prairie du Chien, Wis., to Quincy, Ill., and to a much less extent in adjoining waters. Though their utilization originated so recently as 1891, the present annual product is very large, exceeding 20,000 tons during certain years. The value is much less than that of choice pearl shell, selling usually for less than $25 per ton.

Many univalve shells are sufficiently nacreous and iridescent to be used as mother-of-pearl, especially abalones, top-shells, "green snail" shells, etc. In variety and intensity of coloring the pearly lamina of some of these exceeds that of the pearl oyster. However, the coloring is not so harmonious nor is the shell so thick and flat as in the pearl oyster, consequently they are not desirable for many purposes for which the latter are employed.

Mother-of-pearl is used in the manufacture of a great variety of articles for which it is peculiarly adapted by reason of its hardness and beauty. Most important of these are buttons, knife handles, parasol handles, buckles, penholders, pistol stocks, etc. It is also used for inlaying and for covering opera glasses, card cases, etc. In the aggregate a very large number of persons are given employment in working up this material. Formerly the business was centred at Birmingham, England, and Vienna, Austria, 4,000 persons being thus employed at the former place a few years ago; but it has gradually extended to other localities, especially in France and the United States. It is claimed that about 8,000 persons are employed in working pearl shell in Austria, 5,000 in England, 4,000 in France, 3,500 in America, and many in various other countries. The manufacture of pearl buttons in this country from domestic shells dates from 1891 and is already of very great extent, the 60 factories giving employment to about 2,500 persons and using 12,000 tons of shells annually, yielding about 600,000,000 buttons.

Pearl shell is much used for inlaying, especially of musical instruments, jewelry boxes, domestic furniture, church vestments, etc. Artistic work of this nature is done in the United States as well as in Europe and Asia. The shell is cut in simple patterns and is also used



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BRILLIANT SEA SHELLS

in floral and in arabesque designs. For this purpose the brilliantly colored abalone shell is used with beautiful effect, especially when combined with white shell. Some very elaborate work of this nature is done. A mandolin recently exhibited in this country contained more than 2,000 pieces of four different kinds of shell, and 225 days' work were expended in cutting and finishing the pieces, the whole representing an investment of $1,500. Some years ago there was exhibited in New York a piano, the entire keyboard of which was of pearl. The body of the keys was of ordinary white shell and the flats and sharps were of green abalone, the effect being extremely rich and pleasing.

The most abundant shells in America are those of oysters and clams, especially the former. The product of these approximates 40,000,000 bushels annually and the purposes to which they are applied are numerous. The most important use is in road-making. At various points on the Atlantic seaboard, and particularly in the Chesapeake and the Delaware bay regions, many miles of good roads have been made of this material. It is estimated that 3,000 miles of roads on the Atlantic Coast have been surfaced with shells. Connecticut, Long Island, southern New Jersey, Delaware, Maryland, Virginia, North Carolina and Lousiana contain many excellent examples of oyster shell roads. To cover a road 16 feet wide to a depth of 15 inches in the middle and eight inches at the sides requires about 30,000 bushels of shells per mile, costing on an average of four cents per bushel or a total of $1,200 per mile. To keep such a road in good repair requires about 2,500 bushels of shells per mile annually at a cost of about $100. Though they constitute the cheapest and most convenient material in the sections where they are commonly used, shells are not wholly satisfactory for road material owing to their rapid wear and the spreading of objectionable lime dust.

Oyster shells have been largely employed as ballast for beds of railroads. While not nearly so durable or steady as rock, they answer the purpose fairly well and are the most convenient and economical material in many localities. Examples of their use for this purpose occur on many of the railroads in Maryland, Virginia and Lousiana.

Oyster shells have been extensively used as a source of lime, especially for agricultural purposes, as well as in masonry. Most of the brick buildings erected in colonial times were solidified with shell lime. Owing to its tendency to absorb moisture and thus make the houses damp its use for this purpose was abandoned soon after the discovery of limestone in abundance. The quantity of burned oyster shells spread on farming lands amounts to many thousands of tons annually. These shells are also crushed into small particles and fed to chickens to improve their digestion and their egg laving. This use is increasing in popularity. Oyster shells are also employed in the manufacture of certain special grades of steel owing to their large content of carbon.

A somewhat recent use for shells in America is for spreading on private oyster grounds for the purpose of obtaining a "set" of young oysters. When the extremely small oysters hatch from the floating eggs and sink to the bottom it is important that they find a clean substance for attachment, otherwise they are readily smothered. It is estimated that 4,000,000 bushels of oyster shells are used annually for this purpose, mostly in the waters of New York, Connecticut and Virginia. They are spread immediately before the spawning season, usually in June in the Chesapeake region and in July in Long Island Sound.

Several other varieties of shells are used for "spat collecting," especially "jingles" (*Anomia ophippium*), "quarterdecks" (*Crepidula fornicata*) and scallops (*Pecten irradians*). These are obtained mostly from Peconic Bay at the east end of Long Island where several hundred thousand bushels of mixed shells are dredged annually to be marketed in the oyster planting regions of New York and Connecticut. They are considered superior to oyster shells for "clutch," owing to the fact that they are smaller and only a few young oysters "set" on each, thus avoiding the crowding which occurs when large shells are used. Another reason for their preference is that they are easily broken and disintegrated and so do not encumber the ground after serving as "spat collectors."

Large quantities of shells are used for ornamental purposes. Especially prominent among these are the abalone or ear shells obtained from California, Japan and various other countries. About 500 tons of abalone shells are gathered annually on the Pacific Coast of America, worth about $40,000. This product, however, is only one-fourth or one-third as large as it was 20 years ago. When cleaned and polished the highly iridescent green, red and pearly white colors are exquisite and make these shells beautifully ornamental. Much skill is exercised in polishing in order to produce the best effects. Some of the abalone shells are of such shape and coloring that it is possible in grinding to produce a perfect cross of black against a pearly white background; these meet with ready sale, the purchasers usually assuming that the cross appeared on the shell in nature.

The large green conch or fountain shell obtained on the Florida coast, the West Indies, etc., is much used for ornament. The graceful curves and the delicate tints of lovely pink color make it one of the most attractive of all shells. It is much used in making brooches, earrings, etc., and in the form of beads in imitation of pink coral and pink pearls. Large quantities of conches have been pulverized and used in porcelain manufacture.

The pectens or scallop shells have long been admired owing to their beauty of form. During the Middle Ages pilgrims ornamented their clothing with them, as an indication, doubtless, of having crossed the sea to the Holy Shrine in Palestine, and for this reason they were known as "pilgrim shells." To commemorate that event they were preserved in the heraldic devices of many families whose ancestors had performed that journey. Scallop shells were formerly much used by cooks for holding foods, hence the name "scalloped oysters."

The popularity of shells for personal ornamentation has resulted in their use as currency or standard of value among many primitive peoples. A well-known example of this is the wampum of the North American aborigines,

made from the quahog or hard clam shell, so numerous on the Atlantic Coast. Somewhat less extensive was the use of the tooth shell or *Dentalium* on the northwest coast, and of the abalone on the California coast. Even at the present time in many parts of Africa and to a less extent in British India species of the cowry family are used as currency. In some seasons eight or 10 vessels carry cargoes of the money cowry (*Cyprea moneta*) to the west coast of Africa, where they are exchanged for palm oil and other products.

The window-glass shell (*Placuna placenta*), found in the Pacific and Indian oceans, and especially among the Philippine Islands, has an almost flat bivalve shell, six or eight inches in length. The inside of this shell is glazed over and has a subdued pearly lustre. It is so thin and transparent that print can be read through it, and it is used as a substitute for glass in windows, admitting a soft, mellow light into the room. It is commonly used in the Philippines in windows of residences, etc.

The giant clam (*Tridacna*) yields the largest and heaviest shells in existence single pairs weighing over 500 pounds in some instances. These are much used for ornaments, especially for fountain basins and for benetiers or holy-water fonts. They are found in many tropical waters, and especially on the pearling grounds, where they are a source of danger to divers. A beautiful pair of these shells are used as benetiers in the church of Saint Sulpice in Paris. This pair is said to have been a gift of the republic of Venice to Francis I.

The most artistic use of shells is in the formation of cameos, which are cut from univalve shells made up of laminæ of different colors. The middle lamina, which is usually white, forms the body of the figure in bas-relief, and the dark inner layer forms the ground. The outer or superficial layer is entirely removed, or it may be used to give a varied appearance to the surface of the design.

Of the several varieties of shells employed in cameo cutting, the black helmet (*Cassis tuberosa*) is the most valuable. This occurs in the West Indies and to a less extent on the American coast south of Cape Hatteras. It has a blackish inner coat and the cameo cut from it shows white upon the onyx ground, varying from dark claret to much lighter shades, producing effective results. This shell is ordinarily 12 inches in length, and usually five brooches of average size and several smaller articles may be cut from each one. The bull's mouth (*C. rufa*) is also popular; it has a red inner coat and a sardonyx ground. The horned helmet (*C. cornuta*) gives white upon an orange yellow background. The laminæ of this shell are apt to separate, making it disagreeable to work. The queen conch is also used to a considerable extent; the ground color is brilliant pink, which is somewhat evanescent on exposure to light. An attractive method of using this shell is to incise the bas-relief in the pink layer, using the white as the background, thus reversing the usual method.

Shell cameo figures consist of copies of antiques, original designs and portraits. Sometimes an entire shell — especially of the black helmet variety — is used, and either a small figure is cut on the face of the shell or the entire surface is covered. In the latter case the principal design is in the centre and around it are such minor designs as the fancy of the artist dictates. Some of these sell very high, and hundreds and even thousands of dollars are secured for a single carved shell. One exhibited in this country by a Naples artist represented two years' work. See CAMEOS.

SHELL CAMEOS. The ordinary medium used on which to carve cameos (see CAMEOS) was the kinds of quartz having layers of different colors, such as the onyx. They afforded a hard, durable substance which, when carved, maintained the sharpness of line. Shells such as those of the mollusks, conches, etc., were more or less utilized, probably on account of the ease of graving art effects on their softer body, but the ease of manipulation gained was at the cost of their durability. Few specimens of ancient shell cameos come down to us. Most of our earlier examples date from the 15th and 16th centuries. So the question whether ancient shell cameos were few or whether they are scarce now through being discarded when their beauty was marred by age remains open. An artistically carved *Triducna squamata* shell is in the British Museum, London, claimed to be of Phœnician workmanship (6th or 7th century B.C.).

History.— By the 16th century Italian and French carvers vied with each other in producing artistic cameo effects on shells; there was a good demand for them. These Renaissance pieces are found on such helmet-shaped (*cassis*) conches as the *Cassis rufa* ("bull mouth"), *Cassis tuberosa* ("black helmet"), *Cassis cornuta* ("horned helmet"), also on the *Strombus gigas* ("pink queen's conch") and the *Turbo*. The pearl effect of the nacreous *Meleagrina margaritifera* and even the nautilus shell were utilized; in the former medium is a fine cameo portrait of Napoleon I in the British Museum. The *Cypraea tigris* ("tiger cowrie"), though small was used. The conch shells afforded two layers, white above and, beneath, pink, orange, yellow or gray; some give a reddish or "mahogany" ground. The gray appears to wear longest but most 16th century examples show deterioration. Shell cameos continued to be made in Italy and France till the end of the 17th century, when the demand appears to have died out. Early in the 19th century shell cameos were again in vogue for ladies' brooches and other personal adornment but the fashion fell off largely after the middle of the century only to be revived spasmodically. That the public has continued to appreciate fine effects in spite of reduced pecuniary valuations of mediocre pieces is well evidenced in the fact that so many examples of shell cameos still exist. The hot competition of connoisseurs in acquiring the very finest specimens is emphasized in the instance of the sale dispersing the Marlborough collection in 1899, when a shell Laocoon cameo cut by Fiamingo in the 17th century sold for £335.

Examples.— Some of the finest specimens of shell cameo art to be found in the Morgan Collection donated to the American Museum of Natural History, New York City. Four magnificent examples are given in our illustrations; they are depictions of such subjects as a copy of Guido Reni's 'Aurora' on a Madagascar helmet shell (*Cassis cameo*); the intrusion of Actæon on Diana and her nymphs avenged,

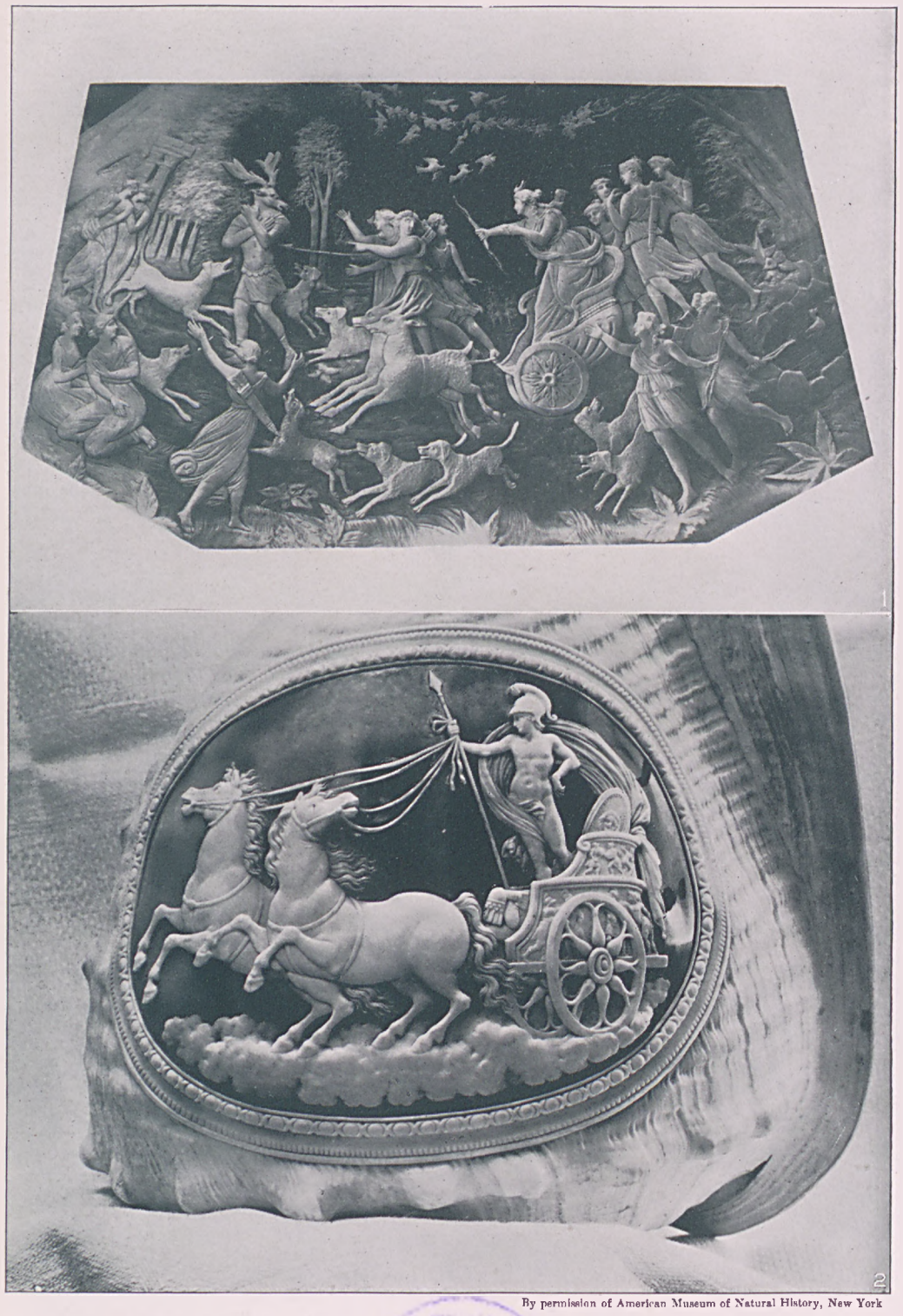


By permission of American Museum of Natural History, New York

2 Engraved Nautilus Shell

1 Guido Reni's "Aurora"

SHELL CAMEOS



By permission of American Museum of Natural History, New York

1 Diana of Actæon

2 Phœbus in his chariot

after an Italian conception; Phœbus in his biga (chariot); an engraved nautilus shell displaying legends, prayers and emblems. In the British Museum also are a number of fine specimens of this art. Cyril Davenport, in his work 'Cameos' (London 1900), gives good illustrations of two white and gray cameos depicting respectively "Ganymede and an Eagle" and "Hercules killing Cacus," both of 16th century Italian origin; a "Centaur" cut in *Cypræa* shell of the same date and origin, and a male portrait mounted as a pendant attributed as the others.

Technique.— In the May 1913 issue of the *American Museum Journal,* New York, L. P. Gratacap, curator, gives a clear description of the technique of shell cameo carving. But few of a number of shells are of value for this purpose, those showing dullness, weakness or turbidity or having speckled under surface of the upper layer are rejected. Thinness of the back layer causes the artist to discard such. Having selected a shell, a tin wheel, assisted with water or emery powder, cuts the object into pieces and the best, from the point of view of color and texture, are selected for operation. The design to be carved is chosen according to its adaptation in size and treatment; the thickness of the layers and other qualifications of the specimen point to the degree of boldness of the execution permissible. In the execution of large *chef-d'oeuvres* the entire shell surface is sometimes covered with the design. Next the artist prepares the surface by eliminating all imperfections such as discoloration, roughness of surface, etc. The outer edge of the cameo is next produced, in oval, square or oblong form, with the aid of a small grindstone whose lower part revolves in a trough of water (grinding is less liable to split or splinter the tender layers of the shell than sawing). A handle is now cemented to the shell with a mixture of tar, resin and brick-dust, wetted paper being used to cover the shell's back. After fixing the handle in the wooden "chancery" of a notched board the shell's surface is cleaned and a drawing of the subject penciled in. In the work of carving 10 graving tools (burins, etc.), of different sizes are used. With the carving finished the background is planished with boxwood burnishers, working in pumice and oil first, then in rotten stone moistened with a little sulphuric acid (oil of vitriol). The polishing deepens the color tones as well as creating a glaze that adds distinction to the relief work. The burnishing process has to be quickly followed by an active cleaning off of the acid with a dampened cotton wad so as to hinder its chemical action from eating into the substance of the shell, thereby creating pittings and unevenness to mar the whole performance. In the more highly talented work a minuteness of detail and almost microscopic expertness are sometimes displayed by the artist that almost equals that to be found in the cameo carvings done in the hard gemstones.

CLEMENT W. COUMBE.

SHELL GAME. See THIMBLE RIG.

SHELL-IBIS, or **SHELL** or **SNAIL EATER,** names for the open-bill (q.v.). It is not an ibis, but a stork, and feeds principally on snails and fresh-water mussels. See OPEN-BILL.

SHELL MONEY. See WAMPUM.

SHELL-SAND. Sand consisting in great part of fragments of shells comminuted by the beating of the waves (see SAND), and often containing a small proportion of organic matter. It is a very useful manure, particularly for clay soils, heavy loams and newly-reclaimed bogs. It is also advantageously applied to any soil deficient in lime. It neutralizes the organic acids which abound in peat, and forms with them compounds which serve as food for plants. Great deposits of shell-sand are found on the coasts of Devonshire and Cornwall, and are of much value in the agriculture of that district. Shell-sand is also found on many other parts of the European coasts, and is much used as a manure in the maritime districts of France, especially Bretagne and Normandy. It abounds upon the coast of Florida and the Gulf of Mexico and in some places has been compacted and cemented into the rocky substance called coquina, and often used as a building-stone.

SHELLABARGER, Samuel, American lawyer and politician: b. Clarke County, Ohio, 10 Dec. 1817; d. Washington, D. C., 6 Aug. 1896. He was graduated from Miami University, Oxford, Ohio, in 1842, and was admitted to the bar in 1847. In 1851 he was elected to the Ohio State legislature, and was a member of Congress in 1861–63, 1865–69, and 1871–73. In 1871 he introduced what was known as the "Ku Klux Law." In 1869–71 he was Minister to Portugal, and after his last term in Congress he was appointed a member of the Civil Service Commission, but devoted himself to the practice of law in Washington. See UNITED STATES — RECONSTRUCTION.

SHELLEY, shĕl'ĭ, **Harry Rowe,** American organist and composer: b. New Haven, Conn., 8 June 1858. He studied music at Yale under Professor Stoeckel and afterwards Dudley Buck, Vogrich and Dvorák. After completing his musical education in Paris and London, he began his career as professional church organist and since 1899 has been engaged at the Fifth Avenue Baptist Church, New York. He has composed many songs, anthems and organ pieces, and his sustained compositions include two sacred cantatas; a lyric music drama, 'Romeo and Juliet'; a lyrical intermezzo, 'Santa Claus'; a 'Symphony in E major'; 'Leila,' an opera. He is a member of the National Institute of Arts and Letters.

SHELLEY, Mary Wollstonecraft Godwin, English writer: b. London, 30 Aug. 1797; d. there, 21 Feb. 1857. She was the daughter of William Godwin and Mary Wollstonecraft. In 1814 she eloped with the poet Shelley to Switzerland, and after the death of his wife, Harriet Westbrooke, was married to him. While traveling with him she composed her famous romance of 'Frankenstein' (1818), which excited an immense sensation. After her husband's death she devoted herself much to literary work, producing 'Valperga' (1823); 'The Last Man' (1826); 'Lodore' (1835); 'Falkner' (1837); and other works of fiction; several biographies for the Cabinet Cyclopædia; 'Journal of a Six Weeks' Tour,' with Shelley (1814); 'Rambles in Germany and Italy' (1844); and

an edition of Shelley's poetical works and miscellaneous writings. (See FRANKENSTEIN). Consult Marshall, Mrs. Julian, 'Life of Mary Wollstonecraft Shelley' (London 1889).

SHELLEY, Percy Bysshe, English poet: b. Field Place, near Horsham, Sussex, 4 Aug. 1792; d. by drowning in the Bay of Spezzia, on or after 8 July 1822. He was the eldest son of Timothy, afterward Sir Timothy, Shelley, a not over-intelligent country gentleman, and grandson of Sir Bysshe Shelley, who was something of an adventurer, handsome, clever and graceless. His mother, Elizabeth Pilford, seems to have handed on to him her beauty and her fondness for writing. After some tutoring he was sent to Sion House Academy, at Brentford, a middle class school, where his shyness and delicacy exposed him to brutal bullying. His biographers seem right in dating from this period his hatred of tyranny and resistance to all forms of oppression. He seems also to have developed his faculty for musing, for scientific speculation and for wide reading, especially at this time in the wild romances of Mrs. Radcliffe and others of her class. On 29 July 1804 he entered Eton where he remained for five years, developing along the lines just described. His tutors were not calculated to inspire his respect and thus could do little or nothing to check his extravagant and abnormal tendencies; nor could the outrageous fagging to which he was subjected fail to be deleterious to so sensitive an organization as his. He was nicknamed «Mad Shelley,» lived as much apart as he could, dabbled in chemistry, haunted romantic spots, read widely — acquiring a taste for the classics, — and found some consolation in the society of Dr. James Lind (later represented as the hermit in 'The Revolt of Islam' and as Zonaras in 'Prince Athanase'), an elderly physician of scientific and eccentric tastes, who was apparently more sympathetic than discreet in his relations with a youth in need of guidance. As was natural, the precocious boy soon began writing and before he was 17 had composed a Radcliffian romance, 'Zastrozzi,' as well as some immature poetry — e.g., parts of the 'Wandering Jew' written in conjunction with his cousin and future biographer, Thomas Medwin, who had also been with him at Sion House. Perhaps more important for his future was his interest in serious writers both practical and theoretical, Franklin, Pliny, Condorcet, who strengthened his native bent toward inquiry and were in part responsible for his early abandonment of religious orthodoxy.

Shelley left Eton, with somewhat unexplained abruptness, in the summer of 1809; he matriculated at University College, Oxford, 10 April 1810. From the amount he published in the latter year it would seem that he spent much of the interim in writing, and it is known that he had a love affair with a cousin, Harriet Grove. At Oxford he formed a friendship with the able, rather cynical Thomas Jefferson Hogg, and was encouraged in his wholesale recalcitrancy. The university was little hospitable to advanced ideas, and when Shelley sent to bishops and heads of colleges, copies of his syllabus of arguments demonstrating 'The Necessity of Atheism,» it was small wonder, though a great pity, that, on his failure to answer their questions, the authorities should have handed him a sentence of expulsion already signed and sealed. (25 March 1811). Hogg protested and was also expelled.

The offending pamphlet was Shelley's sixth publication, and he still lacked several months of being 20. In 1810 he had published — how, is something of a mystery — 'Zastrozzi'; 'Oriental Poetry by Victor and Cazire' (written in conjunction with his sister Elizabeth, withdrawn on the ground that she had borrowed from «Monk» Lewis, long sought for in vain, but finally edited by Dr. Richard Garnett in 1898); 'Posthumous Fragments of Margaret Nicholson' (the mad woman who had tried to kill George III); and 'Saint Irvyne; or, the Rosicrucian,' another Radcliffian romance. It is needless to say that these productions are devoid of intrinsic merit. His fifth publication was 'A Political View of the Existing State of Things,' issued anonymously at Oxford for the benefit of Peter Finerty, a prisoner for libel. This has entirely disappeared.

Shelley left Oxford with mingled regret and indignation and took lodgings in London. His affair with his cousin Harriet Grove had been broken off, and he was soon involved in the most unhappy entanglement of his much entangled life. Not being permitted to come home unless he would break with Hogg and refusing to do this, he found himself adrift in London, and fate brought him in contact with a friend of his sister Elizabeth's, Harriet Westbrook, the pretty daughter of a retired hotel-keeper. She was romantic and fancied herself persecuted by her family; Shelley was also romantic, and persecuted, and quixotic, and inflammable. When he went out of town in July 1811 she wrote him pitiful letters, which so worked upon his feelings that he returned to London, ran away with her and married her at Edinburgh at the end of August. How far the girl's relatives connived at the capture of the baronet's son cannot be ascertained. Naturally the Shelleys were indignant, and cut off the madcap's allowance; but Mr. Westbrook allowed them £200 a year, and finally Shelley's father contributed the same amount.

It is unnecessary to detail their movements at this juncture save to say that they spent some months at Keswick near Southey and then, Shelley being inspired by the theories of William Godwin (q.v.), they went over to Ireland to attempt to redress the wrongs of the long-suffering people. They were accompanied by Harriet's sister, Eliza Westbrook, whose presence grew distasteful to Shelley, and they remained only about two months, since the Irish did not respond enthusiastically to Shelley's pamphlets. He was merely a visionary a little ahead of his times, for Catholic emancipation came peacefully not so many years after his death. When he returned to England, he excited the attention of the government by revolutionary writings, but he was not molested. Believing, however, that an attempt had been made to assassinate him, he returned with his wife and sister-in-law to Ireland, and then he went with Harriet to London, where their first child was born (June 1813). About this time he printed privately his nebulous poem of freethought 'Queen Mab,' accompanied by notes and a «vindication» of vegetarianism to which he had become a convert. Eight years later a pirated edition brought 'Queen Mab' into notoriety, much to its author's disgust. A dia-



logue pamphlet, 'A Refutation of Deism' (1814), followed, bringing his publications up to the number of 14. Meanwhile he and Harriet had become estranged, partly no doubt from natural incompatibility, partly from Shelley's instability, to use no stronger term. Critics and readers will probably never agree to the exact distribution of responsibility between the unfortunate pair; but it seems manifest that admiration for Shelley's genius has unduly influenced many of his biographers in their treatment of the matter. He met Mary, the daughter of William and Mary Wollstonecraft Godwin, and, as before with Harriet, found an attractive girl pining for sympathy at a time when he himself stood in need of it. She was a much more congenial partner for him than the inkeeper's daughter, to whom he had just been remarried according to the rites of the Church of England, and after Harriet made the mistake of leaving him and going with her child to her father's at Bath, he lost little time in persuading his new 17-year-old friend to elope with him.

They left England on 28 July 1814 taking with them Jane (Claire) Clairmont, a daughter of Godwin's second wife by a former marriage. They spent some time in Switzerland and then, after some financial difficulties, returned to England in September. Their experiences were later recounted by Mary Shelley in 'The History of a Six Weeks' Tour' (1817). Meanwhile Shelley had made Harriet the astounding proposition that she should live with him and Mary, and after his return to England he saw her and the son she had borne him during their separation. No reconciliation was affected, however, and Shelley naturally found himself cut off from all his former sources of income. The death of his grandfather early in 1815 induced his father to allow him £1,000 a year in order to guard against his encumbering the family estate. He settled £200 a year on Harriet, took a house near Windsor Forest wrote 'Alastor' (1816, a poem still immature in thought, but indicating a great advance in his command of poetic technic), and studied the classics. In May 1816 he went again to Switzerland with Mary and Jane Clairmont, and there he came under Byron's (q.v.) sway, exerting in his turn a strong influence upon his new friend. The autumn found Shelley back in England established at Great Marlow. Here, in December 1816, he learned of Harriet's suicide in the Serpentine. The immediate causes of the act are obscure; but, whether or not the charges that have been made against Harriet's morals during the closing months of her life are fully or partially justified, it seems absurd to acquit Shelley of all responsibility for her tragic fate.

He was now free to marry Mary Godwin (30 Dec. 1816) but the law would not allow him to recover the control of his two children by Harriet. Shelley resented Lord Eldon's decision, with some justice so far as the management of their education was concerned; yet he had certainly so conducted himself as to make the Chancellor's decision seem equitable to most people at the time. Meanwhile a son, William, had been born to him and Mary, Leigh Hunt had become a friend, and Keats an acquaintance, and the elaborate narrative and allegorical poem 'Laon and Cythna' had been begun. Two political tracts were also published and, true to the humanitarian principles that always actuated his conduct, even when its effects were deleterious to others, Shelley ministered to the sick and needy around him. His charity seemed boundless, and during his visitations he contracted a bad case of ophthalmia. His health had been otherwise poor and, as for many reasons England was not a congenial dwelling-place, he determined to go to Italy. He left England with his family, and by the end of March 1818 was at Turin. Two months previously Ollier had reissued under the title of 'The Revolt of Islam,' the long poem, which on its first appearance, had been entitled 'Laon and Cythna.' The relationship between the hero and heroine had been too close to suit any save the most emancipated readers, and Shelley had reluctantly made a few alterations, in the interest not so much of conventionality and the success of the poem as a plea for the cause of oppressed peoples. No changes could make so long and misty a performance popular; but lovers of poetry will always find 'The Revolt of Islam' incomparable for its glowing pictures and its exquisite melodies. Both in its merits and in its refects it reflects as though it were a mirror, its author's unique, attractive, yet singularly incomplete and unbalanced genius.

The first months in Italy were spent at Lake Como, Milan and the Baths of Lucca, and saw the completion of the romantic poem 'Rosalind and Helen' and the translation of Plato's 'Symposium.' Then Shelley with Jane Clairmont took a disagreeable journey to Venice to see Byron with regard to Miss Clairmont's illegitimate daughter Allegra. (See BYRON). The poem 'Julian and Maddalo' commemorates some features of the visit. Byron loaned Shelley a villa at Este, and the latter at once sent for his family. A few weeks later Mary's second child, Clara, died at Venice. Returning to Este, Shelley began 'Prometheus Unbound' and, charmed by the scenery, wrote the first draft of his beautiful 'Lines Written Among the Euganean Hills.' The winter of 1818–19 was spent at Naples, which inspired, among other things, the 'Lines Written in Dejection,' and a magnificent ode to the beautiful and oppressed city. He also wrote to his friend, Thomas Love Peacock, letters justly famous for their powers of description and admirable prose style. The spring of 1819 found him settled in Rome hard at work upon what is often regarded as his greatest achievement, the aspiring but somewhat nebulous lyrical drama, 'Prometheus Unbound,' published in 1820. Immediately after this he wrote the much more realistic tragedy entitled 'The Cenci,' probably the least subjective of his works, which was composed and published at Leghorn in 1819. Shortly before he left Rome in the summer, his son William sickened and died. The well-nigh heart-broken parents retired to Leghorn and then to Florence, where another son, afterward Sir Percy Florence Shelley, was born. Here in October Shelley wrote that splendid poem, probably the most nobly imaginative of all his lyrics, the 'Ode to the West Wind,' as well as two of his less successful, posthumously published poems, the parody 'Peter Bell the Third' and 'The Masque of Anarchy,' inspired respectively by Wordsworth's famous

poem and by the infamous Manchester Massacre.

The beginning of 1820 saw the wanderers established at Pisa, where Shelley's health began to improve. Several English friends, the Gisbornes and the Williams, and later Lord Byron and the traveler, Trelawny, added to the attractions of the place and stimulated Shelley's genius, if not to the production of any elaborate poems of consequence save 'Adonais' and 'Hellas,' at least to the writing of some of his most beautiful lyrics and charmingly familiar pieces. Among the poems of 1820 were the 'Epistle to Maria Gisborne,' the fantastic 'Witch of Atlas,' the exquisite 'Sensitive Plant,' and those matchless lyrics of their kind, 'The Cloud' and the 'Ode to a Skylark.' The chief productions of 1821 were the Platonic 'Epipsychidion,' the final form of which was inspired by an idealistic passion Shelley conceived for Emilia Viviani, an Italian girl confined in a convent against her will, the delightful and eloquent 'Defence of Poetry' (in prose), the immortal elegy on Keats, 'Adonais' (Pisa 1821), and 'Hellas,' a lyrical drama reflecting the emotions kindled in its liberty-loving author by the Greek revolution. The last-named piece, in some of its choruses at least, gives evidence of such maturing powers that, when we take into account the range of Shelley's interests, mental and emotional, we find it difficult to set limits to his possible achievements if he had been permitted to live and had developed as steadily and as rapidly as he did during the closing years of his short life. It is true that 'Epipsychidion,' despite its marvelous beauty of description and its intensity of spiritual passion, shows that Shelley's idealism was still capable of giving an unwholesome turn to his writings and, to put it mildly, a fatuous twist to his conduct. It is true also that the part Shelley took in luring Leigh Hunt to Italy to start 'The Liberal' (see HUNT, J. H. L., and BYRON) scarcely argues a great increase in worldly wisdom, though it speaks volumes for Shelley's generosity. But, when all deductions are made, the development and the promise of Shelley's 28th, 29th and 30th years are scarcely less remarkable than the development and promise of Keats in the marvelous year of his great odes and 'Lamia.'

In 1822 Shelly began a drama on Charles I, but did his best work on translations from 'Faust' and Calderon's 'Mágico Prodigioso' and on the highly imaginative 'Triumph of Life,' unfortunately left incomplete. In April the Shelleys went with the Williamses to Lerici, and there the friends passed an ideal time until the arrival of the Hunts drew the kind-hearted Shelley early in July to Leghorn and Pisa to look after their comfort. On 8 July he began his return journey with Williams in the yacht *Ariel*, which they owned jointly. Trelawny watched them sail away, saw a squall come up and, when it was over, could catch sight of them no more. His suspicions that all was not well were allayed for a time; but, as the days passed, every one interested in the two voyagers lost hope. On 18 July Shelley's body — if the copies of Sophocles and Keats found in the pockets definitely marked it as his — was washed ashore near Via Reggio. It was first buried in the sand, then cremated — save the heart which would not burn — and the ashes were buried in the Protestant cemetery at Rome (7 Dec. 1822) under the pyramid of Caius Cestius and near the grave of Keats. There seems to be little reason to credit the notion that the yacht was designedly run down.

Shelley is said to have been tall and slender, very youthful in appearance, with a fair complexion and dark blue eyes full of artless wonder. Trelawny at first sight almost took him for a girl. His receptivity, gentleness, charity and other exquisite traits suggest the woman as did his appearance; but his fiery hatred of oppression and shams, his calm defiance of public obloquy, his power to charm men of the world forbid us to regard him as in any sense effeminate. In his writings no less than in his character and in his appearance this blending of essentially manly and essentially womanly characteristics is perceptible. His ideals were passive rather than active; his most indisputably successful poems are in theme and tone expressions of longing, weakness, pain and sadness; his best descriptive passages are hazy; his verse is fluid and melodious rather than deeply harmonious. On the other hand, he has had the power to inspire strong souls with his ideals; more than any other of our poets he has caught the Greek secret of endowing with life mythical figures and conceptions; he was a scholar, a critic, a man of taste and a prose-writer of no mean order; his genius was varied and copious beyond that of most of his contemporaries. With regard to his final rank in English literature no consensus of opinion seems attainable. While the public indifference that depressed him in his own day has long been overcome, he has never attained true popularity either at home or abroad, and his critics are only too likely to become his worshippers or else to display too openly a feeling of hostility toward his life and works. He is still too much the idol of advanced spirits and of people who are inclined to be a trifle exquisite in their literary tastes and somewhat supercilious with regard to the tastes of others. His position as a great poet is scarcely open to question, but his position as a genuine classic in the fullest sense of the term is surely doubtful so long as Matthew Arnold and other qualified critics dissent from the praise of his ideals, the defense of his conduct, and the enthusiasm for his elaborate poems such as 'Prometheus Unbound' to be encountered in extravagant measure in the books and essays of his admirers. Perhaps it is safe to conclude that, while his conduct must be censured in many particulars, his character must be pronounced singularly winning and lovable, and, that, while his elaborate poems, though wonderful, are not sustained works of art, his genius as a lyrical poet is in range and quality unique and extraordinarily high. See ADONAIS; CENCI, THE; ODE TO THE WEST WIND; PROMETHEUS UNBOUND; QUEEN MAB; TO A SKYLARK.

Bibliography.— Various volumes of Shelley's poems, imperfect and in some cases pirated, helped to spread his small reputation until 1839, when Mrs. Shelley published an edition of his works in four volumes. Many important poems and letters have since been published — e. g., in Richard Garnett's 'Relics of Shelley' (1862). The most complete edition of the works in verse and prose is that by H. B. Forman (8 vols., 1876–80). There are good editions of the poetry — in several volumes — by Forman (the new 'Aldine,' 1892), G. E. Woodberry, and others — also in one volume by Dowden ('Globe'), Woodberry (American 'Cambridge'), and T. Hutchinson ('Oxford,' 1904 — the latest and most complete). The prose works were edited by R. H. Shepherd in 1888 (2 vols.). The authoritative biography is that by Edward Dowden (2 vols., 1886) — too plainly the work of an advocate, as J. C. Jeaffreson's 'The Real Shelley' (2 vols., 1885) is the work of a prosecutor. Two good short biographies are those by J. A. Symonds ('English Men of Letters,' 1878) and William Sharp ('Great Writers,' 1887 with a bibliography). Consult also works by F. Rabbe, H. S. Salt, and others and, of course, the earlier lives by Medwin (1847) and Hogg (1858), Trelawny's 'Recollections of Shelley and Byron,' Leigh Hunt's 'Autobiography,' and other books of this devoted friend, etc. Of critical essays there is a large number and variety — see especially those by Matthew Arnold, Walter Bagehot, Dowden, Garnett, Leslie Stephen and Woodberry. For bibliography consult Forman's 'Shelley Library.'

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SHELLEY'S CASE, Rule in, a rule declared by the courts of England late in the 16th century. By this rule when an estate of freehold is acquired by gift or purchase by an ancestor, with remainder to his heirs or the heirs of his body, the word "heirs" is a word of limitation and not of purchase; that is, the ancestor takes the estate in fee or in tail, according to circumstances, and the heirs take nothing. The rule has been repealed or amended by statute in most jurisdictions in the United States, so that the heirs take the remainder.

SHELTER ISLAND, N. Y., island and township, Suffolk county: situated at the eastern end of Long Island between Peconic and Gardiner's bays; length, eight miles; width, four. It is connected with the mainland and the Long Island Railroad by ferry to Greenport. The island was originally owned by the Manhasset Indians; was acquired by Lord Sterling, and during colonial times belonged to the jurisdiction of Connecticut. The coast line is irregular and deeply indented with small bays and inlets, affording good harbors for yachts and small craft; there are excellent facilities for pleasure boating and fishing, and the island is a popular summer resort. The New York Yacht Club has a station on the northern coast. Pop. 1,200.

SHELTON, Don Odell, American evangelist and editor: b. Odessa, N. Y., 5 May 1867. He was secretary of the East Side Branch of the Young Men's Christian Association in New York in 1889–99, and in 1906 became president of the National Bible Institute, New York. He founded the *Bible To-day*, and in 1909 became editor of the *Message*. Author of 'Personal Work and the Personal Worker' (1896); 'Public Use of the Bible' (1898); 'Christianize America' (1903); 'Chapters on the Lord's Faithfulness'; 'The Prayer that Changes Things' (1915), etc.

SHELTON, Conn., borough in Fairfield County, on the Housatonic River, 10 miles west of New Haven, and on the New York, New Haven and Hartford Railroad. There are manufactures of pianos, silverware, paper, paper boxes, brass and pins. Pop. 4,807.

SHEM, the eldest son of Noah; according to the Mosaic account, he is the father of all the nations that inhabited southwestern Asia (Gen. x, 21–31), a territory inclusive of Syria Chaldæa, parts of Assyria, of Persia, and of the Arabian peninsula. Hence the inhabitants are called Semites, and their language and civilization styled Semitic. See SEMITIC LANGUAGES, and consult Budde, 'Die biblische Urgeschichte' (Giessen 1883); and the commentaries on Genesis by Skinner (1910) and Ryle (1914).

SHEMAKHA, shĕ-mä-kä', town in the district of Transcaucasia, on the Zagolovai, about 63 miles northwest of Baku. It is situated in the midst of mountains, on verdant slopes and was once a commercial centre. It has, however, suffered from earthquakes, and one in 1902 almost destroyed it. Silk manufacture is the chief industry. Shemakha's history from 1712 was one of almost continuous warfare; it was captured and occupied in turn by various Persian, Turkish and Russian commanders. On Ptolemy's map it is set down as Kamachia. Pop. 23,000.

SHEN-SI, shĕn-sē, China, a northern interior province, bounded on the north by the Great Wall, which divides it from Mongolia, on the east by Shan-si and Hunan, on the southeast by Hu-peh, on the south by Sze-chuen, and on the west by Kan-su; area, 75,270 square miles. It is traversed by the Pehling range, separating the basins of the Hwang-ho and Yang-tse or Yellow and Great rivers; is well watered, chiefly by the Wei-ho, Loh and Wuting; produces good crops of wheat, millet, and cotton, maize, rape seed, opium, hemp, and tobacco, rears great numbers of horses, cattle, goats and sheep; and has mines of iron, copper, lead, coal and gold. These, with rhubarb, musk and wax, are the chief exports. The capital of the province is Sing an fu. Pop. 8,450,200.

SHENANDOAH, shĕn-an-dō'a, Iowa, city in Page County, on Nishnabotna River, 110 miles southwest of Des Moines, on the Chicago, Burlington and Quincy, the Wabash, and the Keokuk and Western railroads. The Western Normal College is located here as is the World's Missionary Training School. There are seed firms, nurseries, packing industries, and manufactures of wagons, plows, brick, tile, knit goods, flour and cigars. Pop. (1920) 5,255.

SHENANDOAH, Pa., borough in Schuylkill County; on the Pennsylvania, the Philadelphia and Reading, and the Lehigh Valley railroads; about 100 miles northwest of Philadelphia and 12 miles north by east of Pottsville, the county-seat. The place was settled about 1850 by William Kelley, but was not laid out as a city until 1862; in 1866 it was incorporated as a borough. It is the commercial and industrial centre of a region rich in anthracite coal; six large collieries are within the limits of the borough, and a number of other large collieries are within a one-mile radius. The chief industries of the place are connected with the

mining and shipping of coal; machine shops, mining-tool works and foundries are among the manufactories. Other manufacturing establishments are hat and cap factories, brewery and printing establishments. There are several churches, representing the different denominations, public schools, parish schools and a public library. There are also national banks, savings bank and building and loan associations. The government is administered by a chief burgess and a council of 15 members chosen at popular election. Pop. (1920) 24,726.

SHENANDOAH, a river in Virginia which has its source in Augusta County, and flows northeast, on the west side of and nearly parallel to the Blue Ridge. It enters the Potomac at Harper's Ferry, W. Va. Its total length is about 170 miles. It flows rapidly over nearly all its course and furnishes extensive water power which is used for manufacturing and has contributed greatly toward the industrial prosperity of the valley. The valley of the Shenandoah was the scene of many stirring engagements of the Civil War.

SHENANDOAH, The, a ship named after the Shenandoah River, Virginia, bought by the Confederate States during the American War of the Confederacy and placed in commission as a privateer during the last year of that war. The *Shenandoah* was built in Glasgow in 1863; she was intended for the far Eastern trade but was purchased by the Confederates in 1864 and in October of that year was commissioned as a privateer. The ship, named the *Sea King,* had sailed from London for Madeira, where she received her privateersman's crew, composed mostly of officers from the *Sumter,* the *Alabama,* then destroyed, and the *Georgia,* and common sailors, under the command of Capt. James I. Waddell. The *Shenandoah* sailed from Madeira and circumnavigated the globe, via Melbourne, being the only Confederate vessel to do so. In the course of her career she captured or destroyed 39 of the enemy's vessels, valued in the aggregate at about $2,000,000. Her last action, the last hostility of the war, was on 28 June 1865, about three months after the war had ended, when the *Shenandoah* appeared among the American whalers near the Bering Straits and captured 10 vessels before nightfall. On 2 August Captain Waddell learned from an English bark of Lee's surrender, five months before. He sailed at once to Liverpool and delivered his ship to the British man-of-war *Donegal,* never having been captured nor defeated in his entire career. The British government released all of the crew not British-born and turned the vessel over to the American consul.

SHENANDOAH MOUNTAINS, a range in Virginia, belonging to the Alleghanies, extending northeast and southwest, and forming the western boundary of the Shenandoah Valley.

SHENANDOAH VALLEY, Va., between the Shenandoah Mountains on the west and the Blue Ridge Mountains on the east. It is noted for its beautiful scenery and the variety and beauty of its vegetation. The large forests found here contain chestnut, hickory, oak and other hardwood trees. The valley acquired a world-wide fame during the Civil War, when it was the scene of many encounters. In 1862 took place here the campaign of "Stonewall" Jackson (q.v.), and in 1864 it was the scene of the campaigning of Philip Henry Sheridan (q.v.).

SHENANDOAH VALLEY, Military Operations in. At the beginning of the Civil War the Shenandoah Valley was the garden spot of Virginia, full of grain and hay and teeming with livestock and other supplies essential to the Confederates. It became the beaten track and alternately the camping-ground of both armies, witnessed much brilliant strategy and many hard-fought battles, and at the close of the war was a scene of desolation. Its topography favored the Confederates, since, as covered on the east by the Blue Ridge, it was the easiest route for threatening Washington and the most direct route for their armies to move into Maryland and Pennsylvania.

1861.— Virginia passed an ordinance of secession on 17 April, and the next night State troops moving, without authority of the governor, from Staunton and other points in the valley, seized Harper's Ferry, with its arsenal, armory and munitions of war, the small United States guard abandoning the place and retreating to Carlisle, Pa. The town was speedily occupied by several Virginia regiments, and Col. T. J. Jackson put in command. Jackson was relieved by Gen. J. E. Johnston, 23 May. Upon the dash of Col. Lew Wallace on Romney (q.v.), 13 June, and the approach of Gen. R. Patterson from Chambersburg to Williamsport, threatening his position, Johnston, 15 June, burned all the bridges of the Potomac from Harper's Ferry northward to Williamsport, abandoned Harper's Ferry and fell back to Winchester. On 2 July Patterson crossed the Potomac at Williamsport, occupied Martinsburg and, under General Scott's order, threatened Johnston at Winchester, to hold him there, while General McDowell advanced on General Beauregard at Bull Run; but, 18 July, Johnston eluded Patterson and with 9,000 men marched through Ashby's Gap to Piedmont and took cars for Manassas. The Union occupation of the lower valley was brief; Patterson, after Johnston had left the front, fell back to Harper's Ferry, where 25 July he was relieved by General Banks, when the Union troops, save a small guard at Harper's Ferry, were withdrawn to the Maryland side of the Potomac. Late in October "Stonewall" Jackson was assigned to the command of the Confederate forces in the lower valley, with headquarters at Winchester, and was reinforced by Loring's division from West Virginia. Jackson swept the few Union outposts from the fringes of the valley, broke the Baltimore and Ohio Railroad and Chesapeake and Ohio Canal in several places, as far westward as Hancock, and 10 Jan. 1862 drove the Union forces from Romney and occupied it with Loring's division. By order of the Confederate Secretary of War, 31 January, Loring was withdrawn from Romney to Winchester, where Jackson remained during the rest of the winter, the Union forces again occupying Romney on 7 Feb. 1862, demonstrating on Winchester and sending expeditions southward to bring in cattle.

1862.—Active operations began in the valley late in February by the movement of two Union

divisions across the Potomac at Harper's Ferry and an advance on Winchester, near which Lander's division from Romney and the south branch of the Potomac joined the column. Manassas and Centreville were evacuated by Johnston on 8 and 9 March, and Jackson, with his 5,000 men, under Johnston's order, abandoned Winchester on the night of the 11th, as he was on the eve of giving battle to General Banks, and fell back up the valley 42 miles to Mount Jackson, followed by Shields' (formerly Lander's) division of Banks' corps. On the 20th Shields moved back to Winchester, followed by Jackson. Informed on the march that part of Banks' corps was being sent from the valley to reinforce McClellan east of the Blue Ridge, Jackson, in order to detain it in the valley, pressed Shields closely, skirmished with him on the evening of the 22d, and next day brought him to battle at Kernstown (q.v.), less than four miles south of Winchester, and being defeated, again retreated up the valley. His action had the desired effect; Williams' division, which was on the march through Snicker's Gap of the Blue Ridge, was recalled and Banks again pursued Jackson up the valley as far as Harrisonburg, 66 miles from Winchester. Jackson fell back to Swift Run Gap, in the Blue Ridge, on the road from Harrisonburg to Gordonsville, where he watched an opportunity to strike Banks in flank and rear should he advance from Harrisonburg to Staunton. Under President Lincoln's order Banks fell back to Strasburg, and Frémont, commanding a corps, was ordered to move from Franklin and Monterey to co-operate with Banks in an advance on Staunton. Jackson, informed of Frémont's advance, made a rapid movement from Swift Run Gap to Staunton and, pushing through that place on 5 May, engaged Frémont's advance, under Generals Schenck and Milroy, on the 8th, and in a hard-fought battle checked it, Schenck falling back to Franklin. (See McDOWELL, IRVIN). Jackson followed to Franklin, found Schenck too strongly posted to attack and on the 12th began his return march to the valley to attack Banks. On the 19th he started from Mount Solon, near Harrisonburg, on the 21st crossed the Massanutton Mountains from New Market to Luray, and, joined by Ewell's division, swept down the Luray Valley, with over 16,000 men and 48 guns, defeated Colonel Kenly's command of 900 men at Front Royal (q.v.), 23 May, and pursuing, captured the most of it. This movement turned Banks' fortified position at Strasburg, and on the morning of the 24th Banks retreated northward on the valley pike, was struck in flank by Jackson at Middletown and Newtown, but foiled his efforts to intercept him, and after a running fight from Middletown to Winchester, halted on the night of the 24th at Winchester to give battle. On the morning of the 25th Jackson attacked Banks, who had about 7,000 men, defeated him and drove him across the Potomac at Williamsport. (See WINCHESTER, BATTLE OF). Jackson halted his main body a few miles beyond Winchester, but the cavalry followed Banks to the river. On the 28th Jackson sent part of his force toward Harper's Ferry, which made a demonstration, as though intending to force the position and cross into Maryland. Meanwhile Frémont and McDowell, moving respectively from Franklin on the west and Fredericksburg on the east, were converging on Strasburg, in Jackson's rear, to cut him off, upon which he abandoned his demonstration on Harper's Ferry and, starting from Winchester early in the morning of the 31st, by a rapid march slipped through the net prepared for him and arrived at Strasburg 1 June, Frémont's skirmishers being within a mile of the road over which he passed. Next day Frémont gave a stern chase on the valley pike, and Shields' division, now of McDowell's corps, marching by Luray Valley, endeavored to reach Jackson's rear or strike him in flank. Frémont pressed his rear closely in many sharp encounters, driving him steadily through Woodstock, Edenburg and Mount Jackson; but Jackson, avoiding a general engagement, when arriving at Harrisonburg, sent his sick and wounded to Staunton, and 6 June, turning to the left, marched toward Port Republic. Later in the day his rear guard had an encounter with Frémont's advance near Harrisonburg (q.v.), in which Gen. Turner Ashby, a gallant Confederate cavalry commander, was killed, and the result of which was that Frémont's advance was repulsed. Frémont advanced in force from Harrisonburg on the morning of the 8th, and at Cross Keys (q.v.) was met by Jackson, who, after a severe fight, repulsed him. Leaving Ewell's division to resist Frémont, should he renew the fight next morning, Jackson marched the rest of his army to Port Republic to meet Shields, who was moving up Luray Valley, and whose advance, under Colonel Carroll, had dashed into Port Republic on the morning of the 8th, was driven out and joined later in the day by a brigade under Col. E. B. Tyler. Jackson attacked the two brigades of Tyler on the morning of the 9th, and at first was repulsed, but finally, on being reinforced, after a hard fight, drove Tyler from the field and back into Conrad's Store, on the other two brigades of Shields' division. (See PORT REPUBLIC, BATTLE OF). Ewell had been recalled from Frémont's front, the bridge over the South Branch destroyed, thus checking Frémont's pursuit, and that night Jackson marched to Brown's Gap in the Blue Ridge. Frémont and Shields were ordered to cease pursuit and fall back, the former to Middletown to join Sigel and Banks, who had advanced from Harper's Ferry and Williamsport, the latter to join his corps at Fredericksburg. The Valley campaign of 1862 established Jackson's fame as a soldier. From the date of his arrival at Staunton, 5 May, to the battle of Port Republic was 35 days, during which he had marched about 300 miles, fighting four battles and engaging in many other encounters, and with 16,000 men had kept 60,000 Union troops employed, and paralyzed McClellan's campaign against Richmond. On 17 June Jackson stole quietly away from Brown's Gap to join Lee on the Chickahominy. Munford's cavalry brigade and a few infantry were left in the valley to demonstrate in the direction of Strasburg, and Munford was soon relieved by Robertson's brigade, which took post at Harrisonburg and New Market. When General Pope, 27 June, took command of the Army of Virginia, formed by the corps of Frémont, Banks and McDowell, he withdrew Frémont and Banks from the valley to the east of the Blue Ridge, leaving garrisons of a small brigade each at Winchester, Martinsburg and Harper's Ferry

to cover the Baltimore and Ohio Railroad. Throughout July and August 1862 the valley enjoyed comparative quiet. In August Lee advanced upon Pope and drove him back to the defenses of Washington, then crossed the Potomac into Maryland by a route east of the Blue Ridge. Upon arriving at Frederick and finding, contrary to his expectations, that Martinsburg, Winchester and Harper's Ferry were still held by Union troops, interposing on his proposed line of supply through the Shenandoah Valley and interfering with his intended movement into Pennsylvania, Lee on 10 September sent Jackson across the Potomac at Williamsport to clear the valley of Union troops and capture those at Harper's Ferry. Winchester had already been abandoned; General White was driven from Martinsburg to Harper's Ferry on the 11th, and on the morning of the 15th Harper's Ferry surrendered and the entire valley was once more in Confederate possession. When Lee withdrew across the Potomac, after the battle of Antietam, he halted a month on the Opequon and near Winchester; but when McClellan began crossing the Potomac at Berlin, on 25 October, and moved along the east foot of the Blue Ridge, Lee set his troops in motion up the valley, contesting with McClellan possession of the passes leading into the valley, and marching Longstreet's corps through Chester Gap to Culpeper Court House, left Jackson's corps in the valley, near Winchester, with one division at Chester Gap. McClellan was relieved from command of the Army of the Potomac 7 November, and Burnside, who succeeded him, marched from Fredericksburg, and when his advance appeared before that place on the 17th, Jackson withdrew from the valley by way of Swift Run Gap, and joined Lee at Fredericksburg, leaving in the valley a strong brigade of cavalry, supported by a small force of infantry. Union forces now crossed the Potomac and the Confederates were pushed up the valley to New Market, and again the Union troops occupied the lower valley, holding Winchester, Martinsburg and Romney, with outposts at Strasburg, and scouting up the valley of the South branch as far as Monterey. Under cover of this occupation the Baltimore and Ohio Railroad was repaired.

1863.—Active operations in the valley began this year by a Confederate raid from near Staunton to destroy the Baltimore and Ohio Railroad west of New Creek, which resulted in several encounters, and was partially successful, many bridges being burned and the road broken in places as far westward as Clarksburg, W. Va. While these movements were in progress Lee defeated Hooker at Chancellorsville, after which he immediately began preparations for his second invasion of Maryland which culminated in the battle of Gettysburg, and chose the route through the Shenandoah Valley, which offered a safe line of operations, and was held by Union troops not sufficient in number to present a serious obstacle. General Milroy, with about 9,000 men, occupied Winchester, with a brigade in observation at Berryville; General Kelley, with 10,000 men, was at Harper's Ferry; and a detachment of 1,200 men and a battery under Colonel B. F. Smith, at Martinsburg. There were outposts at Romney and also toward Strasburg and Front Royal watching the Confederate cavalry and infantry under General Jenkins in the upper valley. Lee began his movement 7 June by ordering General Imboden, then near Monterey, to move on Romney, by way of the South branch of the Potomac, and directing Jenkins, with his brigade of cavalry, to march down the valley and concentrate at Strasburg or Front Royal, to co-operate with the advance of the army. Ewell's corps, leaving Brandy Station on 10 June, passed through Chester Gap and, marching by way of Front Royal arrived at Cedarville on the evening of the 12th, where Ewell detached Jenkins' cavalry brigade and Rhodes' division of infantry to capture MacReynolds' brigade at Berryville; but MacReynolds, discovering their approach, withdrew to Winchester, which he reached by a roundabout way, on the 13th. Rhodes and Jenkins, avoiding Winchester, pushed on to Martinsburg and, on the 14th, drove Smith and his battery from the place, capturing five guns of the battery that were retiring on the Williamsport road. Smith and his infantry escaped by crossing the Potomac at Shepherdstown Ford and moving to Maryland Heights. Meanwhile Ewell, with the two divisions of Early and Edward Johnson, marched direct on Winchester, surrounded and captured most of Milroy's command on the 15th; after a hard fight, part of those who escaped reached Harper's Ferry and part crossed the Potomac at Hancock. (See WINCHESTER, MILITARY OPERATIONS AT AND NEAR). On the 15th Early crossed the Potomac at Williamsport and Shepherdstown Ford, and occupied Hagerstown and Sharpsburg. On the 17th the garrison at Harper's Ferry was withdrawn to Maryland Heights. Imboden had driven the Union troops from Romney and collected a large herd of cattle, and once more the Valley of the Shenandoah was cleared of Union troops. Lee reported that as the result of these operations Ewell had captured 4,000 prisoners, with their arms, 28 guns, 11 colors, 300 loaded wagons, with their teams and a considerable quantity of stores of all descriptions. After Gettysburg, Lee recrossed the Potomac at Williamsport on the night of 13 July and marched to Winchester and Bunker Hill. When Meade crossed the Potomac south of Harper's Ferry, Longstreet's corps moved up the valley, crossed the Blue Ridge at Chester Gap and marched to Culpeper Court House, where it arrived on the 24th. A. P. Hill's corps followed by the same route, and Ewell's after pursuing Kelley's Union troops west of Martinsburg, found Chester Gap and Manassas Gap held by Meade, who was marching along the east side of the Blue Ridge, and crossing higher up, at Thornton's Gap, joined the army at Culpeper. (See MANASSAS GAP, ENGAGEMENT AT). Again the lower valley was reoccupied by Union troops, and remained in their possession at the opening of the campaign of 1864. Late in the year General Early was put in command of two infantry brigades and some cavalry to hold the upper valley, annoy the Union forces at Winchester, to collect and bring away everything useful to the Union troops or his own, and especially to buy or seize cattle, horses, sheep and hogs, in which the lower valley and that of the South branch abounded. His instructions to do this were carried out to the letter, and the winter of 1863-64 witnessed a most remarkable foraging campaign, in which the lower valley and that of the South branch were stripped of thousands of animals. These foraging parties brought on many collisions between the opposing troops.

1864.— In the general movement planned by Grant for the armies under his command in May 1864, General Sigel, who had command in the Shenandoah Valley, was to advance from Harper's Ferry and Winchester up the valley, seize the rich stores of grain, and form a junction with General Crook, who, with cavalry, infantry and artillery was to march from the mouth of Gauley River, West Virginia, to destroy the Virginia and Tennessee Railroad and reinforce Sigel at Staunton, for a movement on Lynchburg. Sigel had about 24,000 men in his command, most of them guarding the railroad from the Monocacy and Harper's Ferry to Parkersburg and Wheeling. He concentrated part of them at Winchester, ordered his cavalry to Cedar Creek and Strasburg and, starting from Winchester 9 May, with 5,500 infantry and artillery, 1,000 cavalry and 28 guns, moved up the Valley. His cavalry had several mishaps and was badly punished and, after a severe defeat of his command by General Breckinridge at New Market, 15 May, he retreated to Cedar Creek. General Hunter relieved him on the 21st and, being reinforced to 8,500 men, advanced upon Gen. W. E. Jones at Piedmont, defeated him there 5 June, and next day occupied Staunton. (See PIEDMONT, BATTLE OF). At Staunton, Hunter was joined by Crook and Averell; he began the work of destruction, thoroughly and quickly completed it, and on the 7th marched on Lynchburg, which he failed to take. He was driven westward by Early, who, with his corps of 8,000 men, had been sent by Lee, 12 June, from Gaines' Mill to expel Hunter from the valley and, if possible, destroy him, and then to threaten Washington. It may here be stated that Hunter, Crook and Averell marched to the Kanawha, and thus left the valley open to Early. On 23 June Early began his return march from the pursuit of Hunter, and reached Staunton on the 27th. He had been joined by Breckinridge's division of infantry, and McCausland's brigade of cavalry. On the 29th he sent the greater part of his cavalry to destroy the bridges of the Baltimore and Ohio Railroad, and with his main body pushed down the valley turnpike, reaching Winchester 2 July. After driving all the Union troops from the lower valley and destroying as much as possible of the railroad and canal, he crossed the Potomac at Shepherdstown, demonstrated on Maryland Heights (q.v.), and marching through Frederick, defeated Gen. Lew Wallace at Monocacy (q.v.) 9 July, and then marched on Washington. Failing to take Washington by surprise, as he had hoped to do, he retraced his steps, recrossed the Potomac at White's Ford on the 14th, and resting two days near Leesburg, moved on the morning of the 16th for the Shenandoah Valley by way of Snicker's Gap in the Blue Ridge; crossed the Shenandoah River at Snicker's Ferry, and on the 17th took up a position near Berryville. Meanwhile Hunter and Crook, who had retreated from Lynchburg to the Kanawha, had come by steamboat and railroad and joined the forces at Harper's Ferry, and on the 18th and 19th engaged Early at Snicker's Ferry and Berry's Ferry without success. During the 19th Early learnt that Averell's division of cavalry, which also had come from the west, was marching from Martinsburg toward Winchester, threatening his rear, whereupon, during the night, he began a retreat to Strasburg. Averell defeated Ramseur's division at Stephenson's Depot on the 20th, which caused Early to move back with one division from Newtown to Winchester; but being threatened by the Union advance from Berryville, he again fell back to Newtown, and on the 21st concentrated his infantry near Middletown. Next day he fell back beyond Cedar Creek and covered all the roads from Winchester. Crook and Averell united their forces at Kernstown, and on the morning of the 24th Early again moved on Winchester, attacked Crook and drove him back, pursuing beyond Winchester. (See KERNSTOWN, SECOND BATTLE OF). Early continued the pursuit next day to Bunker Hill, Crook and Averell recrossing the Potomac. On the 26th Early marched to Martinsburg (q.v.), and devoted the 27th and 28th to the destruction of the railroad; and on the 29th McCausland crossed the Potomac on his noted raid to Chambersburg, Pa. (q.v.). Early remained at Martinsburg and Bunker Hill until 3 August, sending expeditions into Maryland by Williamsport and Shepherdstown fords to Hagerstown and Sharpsburg, collecting horses, cattle and other supplies, then, recrossing the Potomac on the 6th, concentrated at Bunker Hill on the 7th.

Grant had been annoyed and disturbed by these Confederate irruptions and operations in the valley, and had come to the decision that it should be made untenable for either army and had framed instructions for Hunter to drive the Confederates from it and make it a waste, where no army could live. Hunter yielded the command to Sheridan, who took it 7 August and proceeded to carry out Grant's instructions. On the morning of the 10th Sheridan marched his army from Halltown, near Harper's Ferry, toward Early's line of communication, upon which Early abandoned Winchester on the 11th and fell back to Cedar Creek, followed by Sheridan next day. At Cedar Creek Early received reinforcements — a division of infantry, two brigades of cavalry, and a battalion of artillery from Lee's army, all under command of Gen. R. H. Anderson — and resumed the offensive so aggressively with his cavalry, bringing on several sharp encounters, that Sheridan withdrew his infantry on the night of the 16th, his cavalry following next day, driving all the livestock in that part of the valley before it, and burning the grain from Cedar Creek to Berryville, near which Sheridan had taken position. Early pursued Sheridan on the morning of the 17th, struck and routed part of his command near Winchester, drove it through the town, and on the 21st moved with his whole army to attack Sheridan at Berryville. That night Sheridan, after some sharp encounters with Early's advance, fell back to Halltown. For three days Early demonstrated on Sheridan's position, then, leaving one division in front of Sheridan, marched on the 25th, with four divisions and his cavalry, to Lee Town and toward Sheperdstown, his cavalry pushing on to Williamsport. Beyond Lee Town, Early met and engaged Torbert's cavalry

and drove it back to Shepherdstown. (See SHEPHERDSTOWN, ENGAGEMENTS AT). Early remained that night at Shepherdstown, where he was joined next day by his cavalry, which had demonstrated on Williamsport, and the command returned to Winchester. On 28 August Sheridan advanced his infantry to Charlestown. Merritt's cavalry division, going by way of Lee Town, drove the Confederate cavalry from that place to Smithfield and across the Opequon. Next day Early drove Merritt back through Smithfield, but was checked and driven back himself across the Opequon by a division of Sheridan's infantry. (See SMITHFIELD, ENGAGEMENT AT AND NEAR). There were now several minor encounters and counter demonstrations, and on the morning of 19 September Sheridan crossed the Opequon and in a hard-fought battle defeated Early, who retreated to Newtown and Fisher's Hill, near Strasburg. (See OPEQUON, BATTLE OF THE). Sheridan followed on the 20th, and on the 21st again defeated Early at Fisher's Hill (q.v.), pursuing his retreating troops during the night and next day to Mount Jackson. Beyond New Market, Early abandoned the valley pike and took a road leading to Port Republic. Sheridan, not having his cavalry with him, halted until it came up on the 25th, when it advanced to Staunton and Waynesborough, destroying the railroad between the two places, but, being threatened in flank and rear by Early, fell back, burning mills, storehouses, barns, grain and forage, driving before them all livestock and devastating the whole width of the valley from Staunton northward. On the return march Sheridan's cavalry was harassed by that of the Confederates, who were turned upon and routed at Tom's Brook, 9 October, when Sheridan resumed his march down the valley, halting on the 10th on the north side of Cedar Creek. Early had followed, and on the morning of 19 October fell upon Sheridan's army and drove it back in some disorder, but it was rallied near Middletown and, resuming the offensive, defeated Early, who retreated to New Market. (See CEDAR CREEK, BATTLE OF). This practically ended the valley campaign of 1864. There were numerous raids and cavalry encounters, but no general movements or heavy engagements. Early remained in the vicinity of New Market until 16 December, when he fell back to near Staunton, and Sheridan went into winter quarters at Kernstown. Between the two there was no subsistence for man or beast; the valley had been desolated. One of Early's staff records in his diary that from the time of Early's appearance in the valley late in June till the middle of November he had marched 1,670 miles and had 75 battles and skirmishes.

1865.— During the winter the greater part of Early's command was sent to Lee at Petersburg, leaving Early a very small force of infantry and cavalry. On 27 February Sheridan, with two well-equipped divisions of cavalry of 5,000 men each, started from Winchester on the last campaign up the Shenandoah Valley, and with but little opposition reached Staunton, Early falling back to Waynesborough. The work of destruction at Staunton was completed, and Early was followed to Waynesborough, where 2 March his command of 1,800 men was defeated and dispersed, most of them being captured, with all their colors, 11 guns and train. (See WAYNESBORO, BATTLE OF). Sheridan then moved unmolested to the Virginia Central Railroad, which he destroyed for miles, and marched to White House, on the Pamunkey River, where he arrived 19 March, and then moved to join Grant's army before Petersburg.

There is no area upon which the armies contended that witnessed more brilliant strategy, fertility of resource, more rapid and exhausting marches, and more gallant fighting than that enclosed by the Alleghany Mountains and the Blue Ridge; there was no other section of the country whose inhabitants suffered more than did those of the Shenandoah Valley. Consult 'Official Records,' Vols. II, V, XI, XII, XIX, XXI, XXV, XXVII, XXIX, XXXVII, XLII, XLIII, XLVI, LI; Allan, 'Jackson's Valley Campaign'; Ashby, T. A., 'The Valley Campaigns' (New York 1914); Buffum, F. H., 'Sheridan's Veterans' (Boston 1883–86); Early, 'The Last Year of the War for Independence'; Kellogg, S. C., 'The Shenandoah Valley and Virginia, 1861-65' (New York 1903); Hotchkiss and Allan, 'The Battle-Fields of Virginia' (New York 1867); Pond, G. E., 'The Shenandoah Valley in 1864' (New York 1883); Sheridan, 'Personal Memoirs,' Vol. II; The Century Company's 'Battles and Leaders of the Civil War,' Vols. I, II, III, IV.

E. A. CARMAN.

SHENG-KING, shĕn-king', or **LIAO TUNG,** lyō-toong', Manchuria, the southernmost province, stretching into the Yellow Sea between the gulf of Liao Tung and Korea Bay, has an area of 55,000 square miles, a pleasant climate, and is generally fertile. Pop. 5,500,000. The southern portion of the province is known as the Liao Tung Peninsula; at the extremity is Port Arthur (q.v.) taken by Japan in the war of 1894–95, but retroceded to China on the payment of 30,000,000 taels ($21,300,000). In 1898, however, the Chinese leased it and adjacent territory including Talienwan or Dalny, to Russia. Consequent on the Boxer troubles of 1901 Russia occupied the whole of Manchuria, and rapidly proceeded to colonize it. This procedure was interrupted by the Russo-Japanese war of 1904. See MANCHURIA.

SHENSHIN, Afanasy Afanasevich. See FET, AFANASY AFANASEVICH.

SHENSTONE, William, English poet and landscape-gardener: b. Halesowen, then Shropshire, now Worcestershire, November 1714; d. there, 11 Feb. 1763. He was educated at Oxford, and intended entering a profession, but after inheriting his father's estate, Leasowes, lived in retirement upon it, devoting his life to its embellishment and to writing poetry, much of which was very popular, though little of it is now remembered. Among his poems are 'The Schoolmistress' (1742); 'Pastoral Ballad' (1743); and the stanzas 'Written in an Inn.' His complete works were published in three volumes by Robert Dodsley (1764–69), and an edition of his poems with a memoir by Gilfillan appeared at Edinburgh in 1854. Consult Beers, H. A., 'History of English Romanticism in the Eighteenth Century' (New York 1899).

SHEOL, shē'ōl, a Hebrew word signifying the place of the dead. Wherever it occurs in the Hebrew text it is rendered in the authorized English version by "grave" or by "hell," or by "pit." In the revised version "Sheol" is generally left untranslated in the text, while "grave" is put in the margin. (See HADES; HELL). Consult Jastrow, M. (in *American Journal of Semitic Languages,* Vol. XIV, Chicago 1898); Jensen 'Die Kosmologie der Babylonier' (Strassburg 1890); Schroder, 'Die Keilinschriften und der alte Testament' (Berlin 1902).

SHEPARD, Charles Upham, American mineralogist: b. Little Compton, R. I., 29 June 1804; d. Charleston, S. C., 1 May 1886. He was graduated from Amherst in 1824 and made a special study of botany and mineralogy in the following year. He was lecturer on natural history at Yale in 1830–47, occupied the chair of chemistry at the Medical College of South Carolina in 1854–61 and resumed it a few years after the Civil War. He was professor of chemistry and natural history at Amherst in 1845–52, and from 1852–77 was lecturer on natural history, after which he was made professor emeritus. His investigations resulted in the discovery of a new species of microlite in in 1835, of warwickite in 1838, and of danburite in 1839, and he was also the discoverer of valuable deposits of phosphate of lime near Charleston which have proved of great value to agriculture, and their use in the manufacture of superphosphate fertilizers has made an important addition to the chemical industries of South Carolina. His collection of minerals was at one time the best in the country, but was unfortunately partially destroyed by fire three years after its purchase by Amherst in 1877. In addition to his numerous scientific papers his publications include 'Report on the Geological Survey of Connecticut' (1837); 'Treatise on Mineralogy' (1855), etc.

SHEPARD, Edward Morse, American lawyer: b. New York, 1850; d. 28 July 1911. He was graduated from the College of the City of New York in 1869, studied law and was admitted to the bar. He established a practice in Brooklyn, and was an active member of the Democratic party there, being one of the organizers of the Young Men's Democratic Club of Brooklyn. He held no public office except as member of the civil service commission of the city in 1883–85, and chairman of that commission in 1888–90. In 1884–85 he was a State forestry commissioner, and was the author of the commission's report for that year. In 1901 he was the regular Democratic nominee for mayor of Greater New York, but was defeated by Seth Low. For several years he was counsel for the New York Rapid Transit Commission, and resigned that position in March 1904 to become general counsel for the Pennsylvania Railroad. He wrote 'Martin Van Buren' (in American Statesmen Series; rev. ed., 1900); 'Dishonor in American Public Life' (1882); 'The Work of a Social Teacher' (1884).

SHEPARD, Helen Miller (GOULD), American philanthropist: b. New York, 20 June 1868. She is a daughter of the late Jay Gould (q.v.), and has achieved an extended fame through her benefactions for charitable and educational uses. At the opening of the war with Spain she not only contributed $100,000 to the United States government, but was active in the Woman's National War Relief Association, to which she was a generous contributor. Among other notable gifts of hers are the library of New York University; $50,000 to the naval branch of the Young Men's Christian Association of Brooklyn; and $100,000 to New York University, for a Hall of Fame for Great Americans, in 1900. She married Finley Johnson Shepard 22 Jan. 1913; is a member of the board of the Russell Sage Foundation and of the national board Y. W. C. A.

SHEPARD, Thomas, English Puritan divine: b. Towcester Northamptonshire, 5 Nov. 1604; d. Boston, Mass., 25 Aug. 1649. He was graduated at Emmanuel College, Cambridge, in 1623, and after taking his A.M. there in 1627 he became a preacher at Earles-Colne. His practices, however, displeased Bishop Laud and he was forbidden to preach within the diocese of London. He was later chaplain to Sir Richard Darly in Yorkshire, and afterward was called to the ministry at Heddon Northumberland. Through his non-conformity he was again silenced, this time by Archbishop Neile. He went to Boston in 1635, and was ordained pastor at Newton, now Cambridge. He was active in founding Harvard College and secured its location at Cambridge. He was also instrumental in establishing an Indian Mission. His religious writings attained a considerable reputation. Author of 'The Sincere Convert' (1641); 'The Sound Believer' (1645); 'Theses Sabbaticæ' (1649), etc.

SHEPARD, William, American soldier: b. Boston, Mass., 1 Dec. 1737; d. Westfield, Mass., 11 Nov. 1817. He enlisted in the provincial army at the outbreak of the French and Indian War and served until 1763, participating in the battles of Fort William Henry and Crown Point and attaining rank as captain. He entered the Continental service at the beginning of the American Revolution, became colonel in 1777 and served until the close of the war. He was engaged in 22 battles and won a high reputation for his courage and ability. In 1788–90 he was a member of the executive council and as brigadier-general in command of the militia he defended the arsenal in Springfield at the time of Shays' Rebellion in 1786. He was afterward promoted major-general of militia and in 1797–1803 served as member of Congress.

SHEPHARD, Elliot Fitch, American lawyer and journalist: b. Jamestown, N. Y., 25 July 1833; d. New York, 24 March 1893. He was graduated at the University of the City of New York in 1855 and was admitted to the Bar in 1858, afterward engaging in practice in New York. At the outbreak of the Civil War he was appointed aide-de-camp to Governor Morgan, with rank of colonel, and was assigned to recruiting service. He raised the 51st New York Volunteers, known as Shephard's Rifles, and was instrumental in enlisting a total of about 50,000 men. He founded the New York Bar Association in 1876 and remained in practice in New York until 1884. He bought the *Mail and Express,* New York, in 1888, thereafter editing it. He bitterly opposed Sunday traffic and travel and as owner of the Fifth Avenue stage line refused to permit its operation on Sunday.

SHEPHEARD'S CALENDAR, The. 'The Shepheard's Calendar' was published anonymously in 1579, with a dedication "To the noble and vertuous gentleman most worthy of all titles both of learning and chevalrie, M. Philip Sidney." The book consists of 12 eclogues, each eclogue accompanied by a commentary or glossary that gives the argument and the meaning of unusual words; and purports to be written by E. K., a friend of the poet's identified by some scholars with Edmund Kirke, a college-mate of Spenser's, and by others with Spenser himself. The whole is introduced by a "General Argument" and an epistle to Master Gabriel Harvey of Cambridge. The 'Calendar' was an immediate success. It went through five editions during Spenser's lifetime, the first in 1579, and then in 1581, 1586, 1591, 1597; and was regarded as one of the high-water marks of English poetry. 'The Shepheard's Calendar' is descended from many sources. From the eclogue end its origins were in Theocritus most of all, and to varying degrees in Bion, Vergil, Petrarch and Bocaccio, Mantuan, Sannazaro and Marot. In metres and rhythms, of which Spenser attempts a wide variety, his main sources are Chaucer in particular, Surrey, Marot, and the old ballads. The language of the book marks Spenser as a daring innovator in poetic diction. It consists of words and forms from Lancashire and other dialects, of colloquialisms, old literary words, obsolete expressions, the best of contemporary poetic diction, and coinages in words and in forms, often happy, sometimes far-fetched, of Spenser's own.

The single eclogues employ the traditional devices: the monologues, the two- and three-part dialogues, the singing contests and the stories. The scheme of an eclogue to the month, following the general plan of country almanacs was original. But this motive is followed only indifferently; in October not at all, quite fully in the January, February, November and December divisions. In like manner the romance of Colin's love for Rosalynd also runs through some of the eclogues and is absent from others. The two motives combine to make the framework of the poem.

There is probably no one book in English that looks in so many poetic directions as 'The Shepheard's Calendar.' It is the work of a young writer possessed of enthusiasm, the splendor and excitement of the Renaissance, wide taste and reading, and one of the supreme lyrical gifts in all poetry for tone, rhythm, ornament and the enveloping glamor of a beautiful and rare spirit and mentality. Most of Spenser's later work finds its beginnings in the 'Calendar'; and though he progressed far beyond it in every way, in profundity of content, in rhythm and imagery, the progression was in almost every case directly from the qualities of his first work. As the poet's poet, which he undoubtedly is, Spenser stands from the first revealed. In 'The Shepheard's Calendar' lovers of Milton will find many of his qualities predicted, and to a varying extent the same is true of Shakespeare, Keats, Chatterton, Blake, Coleridge, Wordsworth and Tennyson, to mention only a few of Spenser's debtors.

STARK YOUNG.

SHEPHERD, Francis John, Canadian physician: b. Cavagnol, Quebec, 25 Nov. 1851 He was graduated M.D. at McGill University in 1873 and later studied in England, France, Germany and Austria. He was associated with the medical faculty at McGill from 1875 and from 1883 was professor of anatomy there, becoming dean of the medical faculty in 1908. From 1883 he was senior surgeon of the Montreal General Hospital. He was president of the Canadian Medical Association in 1901. He is joint author of 'American Text-Book of Surgery' (1892); 'Retrospect of Surgery' (3 vols., 1881–94) and editor of 'Robert Craik's Addresses' (1907).

SHEPHERD, William Robert, American historian and educator: b. Charleston, S. C., 12 June 1871. He was graduated at Columbia University in 1893 and later studied at the universities of Berlin and Madrid. He was a member of the faculty at Columbia from 1902 and from 1912 was professor of history there. He has specialized in United States colonial history and in that of Latin America. He is honorary professor of the University of Chile. Author of 'History of Proprietary Government in Pennsylvania' (1896); 'Battle of Harlem Heights' (1898); 'The Cession of Louisiana to Spain' (1904); 'Passing of New Amsterdam' (1912); 'Central and South America' (1914); 'Latin America' (1914); 'Expansion of Europe' (1915); 'Commonsense in Foreign Policy' (1917), etc.

SHEPHERD OF HERMAS. See HERMAS, SHEPHERD OF.

SHEPHERD KINGS. See HYKSOS.

SHEPHERD'S PURSE, a small cruciferous weed (*Capsella bursa-pastoris*). It has rosettes of lobed or pinnatified leaves, a short stem, branching into spreading pedicels carrying racemes of small white flowers, rapidly succeeded by triangularly heart-shaped capsules, which have suggested this name and also those of mother's heart, case-weed, shepherd's bag, etc., by their resemblance to ancient wallets. Originally European, this plant has been naturalized throughout the temperate regions, blooming during the entire year, and was formerly used as an anti-scorbutic and in hæmatura.

SHEPHERDSTOWN, W. Va., town in Jefferson County, on the Potomac River and on the Norfolk and Western Railroad, about 65 miles west of Washington, D. C., and 10 miles above Harper's Ferry. It was settled in 1732; but there is good reason to believe a settlement was made as early as 1718 by German colonists from Pennsylvania. In 1762 it was incorporated as a town; first called Mecklenburg and afterward changed to Shepherdstown. It is in an agricultural region. The chief manufactory is a knitting factory. Other industrial establishments are a flour mill, machine shop and cement-works. There are several churches, some of which are exclusively for the colored inhabitants. The educational institutions are Shepherd College, State Normal School and graded public schools. The government is vested in a mayor, recorder and a council of five members, elected annually. Pop. 1,276.

SHEPHERDSTOWN, Engagements at and Near. Situated in a great bend of the Potomac, nine miles east of Martinsburg and on one of the principal routes from the Shenandoah Valley to Maryland, Shepherdstown, W. Va., was the scene of much activity during

the Civil War. Both armies, at various times, crossed the Potomac at a ford about one mile below the town, which was used by the Confederates when they withdrew from the Antietam battlefield, 18–19 Sept. 1862, and by a great part of Lee's infantry when they marched to Gettysburg in June 1863. On 25 Sept. 1862 General Pleasonton's cavalry division crossed the ford on a reconnaissance toward Martinsburg and a few miles beyond Shepherdstown encountered the Confederates in some force, and was checked after capturing a few men. Again (1 Oct. 1862) Pleasonton crossed the river, with 500 cavalry and a battery of six guns, drove the Ninth Virginia cavalry from Shepherdstown and pursued it across the Opequon and into Martinsburg, where he encountered the rest of Col. W. H. F. Lee's brigade and a battery, both of which were driven from the place. Pleasonton remained in the town until 5 P.M., when he started on his return march, followed by Confederate cavalry and two guns, with whom about dark he had an encounter when within a mile of Shepherdstown, after which he recrossed the Potomac. The loss was slight on both sides. On 16 Oct. 1862 in co-operation with General Hancock's division, which advanced from Harper's Ferry toward Charlestown and Winchester, General Humphreys, with about 500 cavalry, 6,000 infantry and six guns, marched from Sharpsburg, crossed Shepherdstown Ford at 4 A.M., and moved toward Smithfield on a reconnaissance. A mile out of Shepherdstown his advance was contested by Fitzhugh Lee's cavalry brigade and two guns. Lee was driven beyond Kearneysville, where he was reinforced by cavalry and a brigade of infantry, but was driven back, and Humphreys went into bivouac. The latter resumed his march on the morning of the 17th, and one and a half miles beyond Kearneysville came upon Lee in a strong position. Not desiring to bring on an engagement, and having his cavalry make a dash on Smithfield, which was found occupied by Confederate cavalry, Humphreys returned to Sharpsburg by the way he had gone out, followed by cavalry and artillery as far as Shepherdstown.

After his Gettysburg campaign, Lee recrossed the Potomac at Williamsport 14 July 1863. On that day, to watch his movements, General Gregg's cavalry division was sent across the Potomac at Harper's Ferry, and on the 15th marched to Shepherdstown, driving some cavalry from the town that evening and encamping nearby. On the 16th, about 1 P.M., Gregg's advance near Kearneysville was attacked by Fitzhugh Lee, with his own and Chambliss' brigade, supported by Jenkins' brigade. Gregg was gradually driven back upon his guns, when he rallied his command, and the sharp engagement was continued, lasting until dark, both sides dismounted. This engagement was on the Boteler farm, about a mile from town. During the early morning Gregg fell back to Harper's Ferry, with a loss of 70 killed, wounded and missing as the result of his fight on the 16th. The Confederate loss was 106.

On 21 Aug. 1864 Sheridan fell back from the line of the Opequon to Halltown, near Harper's Ferry, the cavalry, under General Torbert, being moved to his right at and near Shepherdstown. General Early demonstrated on the position at Halltown for three days, and on the 25th with the four infantry divisions of Rodes, Ramseur, Gordon and Wharton, with their artillery, moved northward toward Shepherdstown, his cavalry at the same time moving on Williamsport to keep up the impression of an invasion of Maryland and Pennsylvania. Between Lee Town, seven miles southwest of Shepherdstown and Kearneysville, Early came upon Merritt's and Wilson's cavalry divisions, under Torbert, who had marched from Shepherdstown and Duffield's that morning on a reconnaissance to Lee Town. Torbert promptly attacked Wharton's division, Early advanced and drove it back in confusion nearly a mile. Early brought up the rest of his command, and after a short and sharp contest in which artillery was freely used, Torbert ordered his two divisions to fall back, Wilson's by the route it had come, and Merritt's by the direct road to Shepherdstown. Merritt was followed so closely by Early that when near Shepherdstown on the Charlestown road, Custer's brigade was ordered out to repel the advance, in which it succeeded, driving it back; but it was in turn struck in flank and rear by Gordon's division, which had marched across the country. Devin's brigade was sent to Custer's relief, and engaged Gordon. Custer was cut off and, after a sharp fight, made his escape by crossing the Shepherdstown Ford into Maryland. It was now dark; Merritt rejoined Wilson and both joined Sheridan. The loss was considerable on both sides. Early encamped near Shepherdstown, and next day moved back across the Opequon, and on the 27th to Bunker Hill. (See CIVIL WAR IN AMERICA). Consult Dandridge, Mrs. D., 'Historic Shepherdstown' (Charlottesville, Va., 1910).

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SHEPHERDSTOWN (Boteler's) FORD Engagement at. General Lee withdrew from the field of Antietam during the night of 18 Sept. 1862 and recrossed the Potomac into Virginia by the Shepherdstown or Boteler's Ford, one mile below Shepherdstown and about two and one-half miles from Sharpsburg. Leaving some artillery and two small infantry brigades at the ford to hold McClellan in check, he marched his army for the Opequon. On the morning of the 19th Pleasonton's cavalry followed Lee to the Potomac, and in the evening detachments of the Fifth corps forded the river, drove away the Confederate infantry, and seized some of the artillery. To ascertain how far Lee had retreated, General Porter was authorized by McClellan to send a reconnaissance beyond the Potomac on the morning of the 20th, and Porter ordered over the divisions of Generals Morell and Sykes. Before daylight two regiments crossed with spare horses, secured three guns that had been taken the night before, and took them to the Maryland side. At 8 o'clock Sykes crossed the river with Lovell's brigade of regulars and pushed out a mile on the Charlestown road, when he discovered the Confederates in force, upon which Lovell fell back, skirmishing, to the heights near the river, and Warren's small brigade of two regiments formed on his left. The Confederates encountered were Gen. A. P. Hill's division of six brigades, supported by three brigades under

General Early, all sent back by Lee when he heard that the Union advance had crossed the river. Hill's skirmishers had slowly pressed back Lovell, and meanwhile Barnes' brigade of Morell's division had crossed the river, under orders to go on the road to Shepherdstown; but Sykes ordered it straight to the top of a high steep bluff on the river bank to connect with Lovell's right. Before Barnes' brigade had all taken position Sykes came to the conclusion that he was too largely outnumbered to remain on that side of the river, and ordered the troops to recross, which was done by the left in good order, under cover of a heavy artillery fire from the Union batteries on the Maryland side; but the withdrawal on the right was not accomplished without disaster. The 118th Pennsylvania or "Corn-Exchange" regiment, 737 officers and men, had ascended the high bluff, and was not fairly in position when it was attacked by five brigades of A. P. Hill's division. It made a good fight, but was attacked on both flanks and in front, Colonel Prevost was wounded, and it was driven in disorder over the precipitous rocky bluff, many being killed and wounded in falling to the roadway below. The men began to cross the river, and the Confederates, advancing to the bluff, fired upon them as they were struggling to regain the opposite shore. Some were killed in the water; some were drowned; others, who took refuge in old lime-kilns on the bank of the river, were killed or wounded by careless firing of the Union batteries; and some surrendered. In this disastrous affair the regiment lost 53 killed, 10 wounded, and 105 missing, or 269 out of a total brigade loss of 317. A. P. Hill's loss was 30 killed and 231 wounded. The Union loss on the 19th and 20th was 71 killed, 161 wounded and 131 missing; the Confederate loss, 33 killed and 252 wounded. After the engagement of the 20th A. P. Hill and Early marched from the field and joined the main body of the army, which bivouacked that night on the Opequon near Martinsburg. Consult 'Official Records' (Vol. XIX); Smith, 'History of the 118th Pennsylvania Volunteers.'

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SHEPLEY, shĕp'lĭ **George Foster,** American soldier and jurist: b. Saco, Me., 1 Jan. 1819; d. Portland, Me., 20 July 1878. He was graduated from Dartmouth in 1837, from the Dana Law School at Cambridge in 1839, and admitted to the bar in 1840. He settled in Portland in 1844, where he established a large practice and in 1848–49 and in 1853–61 he was United States attorney for Maine. In 1861 he was commissioned colonel of volunteers in the Union army, participated in General Butler's expedition against New Orleans, commanded as acting brigadier-general at Ship Island, and after the capture of New Orleans was appointed military commandant, acting mayor, and was in charge of the defenses of the city until 1862 when he was appointed military governor of Louisiana and commissioned brigadier-general of volunteers. He commanded the military district of Virginia and North Carolina in 1864, was with the army of the James in 1864–65, and entered Richmond 3 April 1865. He was appointed military governor of the city and held the command until June when he resigned and resumed his law practice. From 1869 until his death he served as United States circuit judge of the First Judicial Court of Maine. His decisions appear in Holmes' 'Reports' (1877).

SHEPPARD, Edmund Ernest, Canadian journalist: b. South Dorchester, Ontario, 29 Sept. 1855. He was educated at Bethany College, West Virginia, and engaged in journalism in the southern United States. After his return to Canada he was editor of the Saint Thomas *Journal* in 1881–83; editor-in-chief of the Toronto *News* in 1883–87; of the Toronto *Saturday Night,* which he founded, in 1887–1906; and editor-in-chief and owner of the Toronto *Star* in 1895–97. He represented the Dominion government on a commercial mission to Central and South America in 1897. Author of several novels, 'Dolly'; 'The Wisdom of Jones,' etc.

SHEPPARD, John (Jack), English criminal: b Stepney, Dec. 1702; d. Tyburn, 16 Nov. 1724. He was brought up in the workhouse of Bishopsgate, his father having died the year after his birth. He was apprenticed to a carpenter, but falling in with bad company deserted his master and took to a life of thieving. He was first brought up in court in 1723 as a runaway apprentice, but having secured his release, he thenceforth, as he confessed, fell to robbing almost everyone that stood in his way. Having offended Jonathan Wild, a broker of stolen goods and informer against thieves, his capture was effected 23 July 1724. He was tried at the Old Bailey and condemned to death, but before his execution was effected he escaped from prison twice. He was hanged at Tyburn in the presence, it is said, of over 200,000 people. He was celebrated by all the journals and chapbooks, and even by the divines, who exhorted their flocks to emulate him in a spiritual sense. Plays have been constructed around his personality and Harrison Ainsworth made him the hero of his novel 'Jack Sheppard' (1839).

SHEPPARD, Morris, American politician: b. Wheatville, Morris County, Tex., 28 May 1875. In 1895 he was graduated at the University of Texas and subsequently studied at Yale. In 1898–99 he practised at Pittsburg, Tex., and since 1899 at Texarkana. On 15 Nov. 1902 he was elected to the 57th Congress for the unexpired term (1902–03) of his father. Mr. Sheppard was re-elected to the 58th, 59th, 60th, 61st and 62d Congresses (1903–13) from the first Texas district. On 29 Jan. 1913 he was elected United States senator for the unexpired term (ending 4 March 1913) of Joseph W. Bailey, and on the same day was elected for the term 1913–19. He was re-elected to the Senate in 1919.

SHERATON, shĕr'a-tŏn, **Thomas,** English furniture designer and cabinet-maker: b. Stockton-on-Tees, 1751; d. London, 22 Oct. 1806. He was apprenticed to a cabinet-maker and was self-taught in drawing and geometry. He settled in Soho square, London, about 1790 and there began the publication of the books of furniture designs which place him in the front ranks of English furniture designers. He appears to have had a small shop, but very little of his work is known to be in existence. He made a scanty living through the sale of his books, by teaching drawing, occasional preaching in Baptist chapels, and the publication of a number of religious books. He failed to

achieve personal success, his talents and tastes being too much diversified and untrained for concentrated endeavor. His furniture designs, however, had a far-reaching influence, as they were widely copied, and they remain unexcelled as models of exquisite taste and simplicity. His designs showed the square, tapering leg, simple lines and quiet ornament, marquetry being almost the only decoration he used. He used satinwood to a marked extent, and when he employed carvings they were of a flat description. His theory was that beauty in furniture lies in utility worked out through sound lines of construction. His later work shows an unfortunate departure from the rules laid down at the beginning of his career, his natural inventiveness being tempted by the vogue of the French Empire. In these he departed from his oldtime beauty and simplicity of line, and his influence is responsible for much of the grotesque carvings and ugly designs of the succeeding period. His name, however, is inseparably connected with his early designs. His books of designs are 'The Cabinet Maker and Upholsterer's Drawing Book' (111 plates, 1791; 2d ed., 119 plates, 1793–96; 3d ed., 122 plates, 1802); 'The Cabinet Dictionary' (1803); 'The Cabinet Maker and Artist's Encyclopedia' (30 parts, 1804–06). The last work was planned in 125 parts, of which but 30 were completed when he died.

SHERBROOKE, shĕr'brŭk, Sir **John Coape,** English soldier: b. England 1764; d. Calverton, Nottinghamshire, 14 Feb. 1830. He was commissioned ensign in the army in 1780, served in Nova Scotia in 1784–85 and in 1796–1800 was on duty in India and South Africa. He was sent to Egypt to negotiate a treaty with the Beys in 1807, and in 1808 was in temporary command of all the troops in Sicily. He later served in Portugal, was second in command to Wellesley in the campaign of 1809, and was awarded a medal for gallant conduct at Talavera. In 1811 he became lieutenant-general and was appointed governor-general of Nova Scotia. He led a naval expedition to Maine in 1814 and captured some places on the Penobscot River. In 1816 he became captain-general and governor-in-chief of Canada. He resigned in 1818 in consequence of a paralytic stroke and lived the remainder of his life in retirement. Consult 'Dictionary of National Biography' (London 1897).

SHERBROOKE, Robert Lowe, Viscount. See Lowe, Robert.

SHERBROOKE, Canada, city, port and capital of Sherbrooke County, Quebec, on the Canadian Pacific, Grand Trunk, Boston and Maine and Quebec Central railways; 101 miles east of Montreal. The city is built on both sides of the Magog River at its junction with the Saint Francis and both rivers are crossed by fine bridges and afford abundant water power for manufacturing. The most important industry is the manufacture of woolen cloth, one mill employing over 1,000 persons; other manufactures are paper, cotton goods, carpets, clothing, foundry products, machinery, axes, bobbins, electrical supplies and cigars, and there are breweries, tanneries and flour and lumber mills. Copper, asbestos and chrome iron ore are mined in the vicinity. The local trade is important and lumber, paper pulp, asbestos, copper and lime are exported to the United States. It is the seat of a Roman Catholic bishop, and has fine county buildings, post-office building, several churches, an academy, good schools, banks and daily, semi-weekly and weekly newspapers. Pop. (1921) 22,097.

SHERIDAN, Philip Henry, American soldier: b. Albany, N. Y., 6 March 1831; d. Nonquitt, Mass., 5 Aug. 1888. He was graduated at the United States Military Academy in 1853. He served in the 3d and 4th infantry regiments in the West until May 1861, when he was appointed captain in the 13th infantry. In December 1861 he was made quartermaster and commissary of the Union army in southwestern Missouri. He was Halleck's quartermaster during the Corinth campaign in 1862. In May 1862 he was appointed colonel of the 2d Michigan cavalry and was made brigadier-general of volunteers in July. He served with distinction in the battles of Perryville and Stone River (qq.v.), and was made major-general of volunteers 31 Dec. 1862. In 1863 he distinguished himself in the bloody battle of Chickamauga (q.v.), and also bore an important part in the battle of Chattanooga (q.v.), where he attracted the attention of General Grant, who, when he assumed command in Virginia, had Sheridan transferred (April 1864) to the Army of the Potomac as commander of the cavalry corps. Sheridan was actively engaged in the battles of the Wilderness, Spottsylvania Court House, Cold Harbor (qq.v.), etc. From 9–25 May 1864 he raided the Confederate communications around Richmond, destroying 10 miles of track on three important railroads, cutting the telegraph wires, capturing several trains and causing much alarm in the Confederate capital. On 28 May he fought the battle of Hawes' Shop (q.v.) and 11 June that of Trevilian's Station. Nearly every day in May, June and July Sheridan's cavalry was engaged with the Confederate troops or raiding their communications. On 7 Aug. 1864 he was placed in command of the Army of the Shenandoah with instructions to clear the Confederates out of the valley. He defeated Early at Winchester (q.v.) 19 September, and at Fisher's Hill 22 September and was rewarded by being made a brigadier-general in the regular army. After the battle of Fisher's Hill he laid waste the Shenandoah Valley. Practically everything destructible was destroyed and the horses, cattle and sheep were driven out. His object in devastating the country was to prevent future expeditions by the Confederates up the valley by destroying the means of subsistence. The non-combatants were reduced to the verge of starvation, and Sheridan has been much censured for his course. On 19 Oct. 1864 his army was surprised and routed in the battle of Cedar Creek (q.v.) by Early, who neglected to pursue. Sheridan, who was 20 miles away when the battle began, made his famous ride, rallied his demoralized troops, returned and decisively defeated the army of Early. On 8 Nov. 1864 Sheridan was made major-general in the regular army. From 27 Feb. to 24 March 1865 he made a raid from Winchester to Petersburg, cutting three railroads, two canals, telegraph wires, destroying supplies, and leaving only one line of railroad by which supplies could

be brought to Lee's army. During this raid he defeated Early again at Waynesborough (q.v.). At Five Forks (q.v.) 1 April Sheridan turned Lee's flank, forcing him to evacuate Petersburg and begin the retreat to Appomattox. In the pursuit of Lee, Sheridan took a leading part, and when he had placed his army squarely across the Confederate line of march at Appomattox Court House the surrender took place (9 April).

From May 1865 to March 1867 Sheridan commanded the Military Division (later Department) of the Gulf. His strong force on the Mexican border encouraged the Liberals and forced the French to withdraw their support from Maximilian. In his 'Personal Memoirs' Sheridan states that material assistance was secretly given by the United States authorities to the Liberal army under Juarez, 30,000 muskets at one time being sent to the latter from the United States arsenal at Baton Rouge. After the passage of the reconstruction acts, in March 1867, Sheridan was placed in command of the fifth Military District, consisting of Louisiana and Texas, with headquarters at New Orleans. His career as military governor was a stormy one. He was in favor of radical measures in dealing with the conquered Southerners, and in the troubles that arose in his district he was supported by General Grant and opposed by President Johnson, who sent several messengers to him in the endeavor to influence him to a more moderate course. Sheridan, believing that severe measures were necessary, refused to conform to the suggestions of the President's agents, and Johnson, after Sheridan's wholesale removal of civil officers, relieved him from command of the Fifth Military District in September 1867. General Grant strenuously protested, but Johnson was firm and Sheridan was transferred to the Department of the Missouri. In 1869, when General Grant became President, Sheridan was made lieutenant-general. In 1870-71 he was with the German armies observing the campaigns of the Franco-German war; in 1875 was again sent to New Orleans on account of the political riots in that city; in 1878 commanded the Western and Southwestern Military Divisions; in 1883 succeeded Sherman as commander-in-chief of the army; and in 1888 was made general. In person, General Sheridan was short and stout, with rather harsh features. In manner he was gruff, but not unkind. He was trusted by his soldiers, who called him «Little Phil» and believed him invincible. He married, in 1879, Miss Rucker, daughter of Gen. D. H. Rucker of the United States army. In religion, General Sheridan was a devout Roman Catholic. He always refused to enter politics. An equestrian statue has been erected in his honor at Albany, N. Y.

Consult Sheridan, 'Personal Memoirs' (1888); Davies, 'General Sheridan' (1895); Newhall, 'With General Sheridan in Lee's Last Campaign' (1866).

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SHERIDAN, Richard Brinsley, English dramatist, orator and statesman: b. Dublin, Ireland, 30 October 1751; d. London, 7 July 1816. His father, Thomas Sheridan, was an actor; his mother was a dramatist and novelist. At the age of seven he was taken to London. From 1762 to 1768 he attended Harrow school, where, in collaboration with a fellow-pupil named Halhed, he wrote a farce called 'Jupiter.' In 1771 he moved to Bath, where he learned at first hand the foibles of the fashionable world. Among the people that he met was the eminent composer, Thomas Linley. Linley's daughter, well-known as a singer, was a lovely and coquettish girl with many admirers. To shield her from the persecutions of a Major Mathews, Sheridan arranged to escort her to a French convent. Near Calais he became secretly married to her; his age was 21 and hers 18. Linley brought them back to Bath and separated them. After his return, Sheridan fought two duels with Mathews, disarming his opponent the first time and being himself seriously wounded the second. On 13 April 1773, he married Miss Linley openly.

At a very early age he began writing for the theatre. On 17 January 1775, his farce-comedy, 'The Rivals,' was produced at Covent Garden. It failed and was withdrawn. In a revised form it reappeared on 28 January, and is still being played. His farce, 'Saint Patrick's Day,' was first acted on 2 May 1775. It was followed on 21 Nov. 1775, by 'The Duenna,' a comic-opera, whose great success eclipsed the popularity of Gay's 'Beggar's Opera.' In 1776 he succeeded Garrick as manager of the Theatre Royal, Drury Lane. He was careless in business, but his personal popularity atoned for his practical shortcomings. He produced a revision of Vanbrugh's 'Relapse,' called 'A Trip to Scarborough,' 24 Feb. 1777. On 8 May 1777, he presented at Drury Lane one of the greatest comedies of all time, 'The School for Scandal.' He was then only 25. A farce called 'The Critic,' in which he satirized his jealous rival, Cumberland, was performed 29 Oct 1779. This practically closed his career as a dramatist; though on 24 May 1799, he produced 'Pizarro,' a melodrama adapted from the German of Kotzebue.

His gaiety and talent made him a great favorite in society. On 12 Sept. 1780 he was elected to the Commons for Stafford, and began a remarkable parliamentary career. He developed wondrous power as an orator, and was unexcelled for brilliancy and eloquence. He was conspicuous in the impeachment of Warren Hastings. On 7 Feb. 1787 his great speech before the House of Commons, relating to the Princesses of Oude, held his auditors enthralled for five hours and a half. Hardly less effective was his speech at the arraignment of Hastings in Westminster Hall, June 1788. Throughout his public career he maintained the reputation of a pure and independent statesman.

His wife died 1792; and on 27 April 1795 he married Esther Jane Ogle. His income from Drury Lane averaged £10,000; but he often overdrew his resources to lead a dazzling social life. From 1791 to 1794 the Theatre Royal was rebuilt at ruinous expense to Sheridan; and the destruction of the new house by fire in 1809 involved him in serious financial difficulties. In 1812 he failed of re-election to Parliament; and in August 1813 he was arrested for debt. His health, weakened by social dissipations, failed rapidly; and he died



GENERAL P. H. SHERIDAN

almost in want. He was buried in Westminster Abbey. (See THE RIVALS; SCHOOL FOR SCANDAL). Consult Rae, Fraser, 'Sheridan, a Biography'; Matthews, Brander, 'Introduction to Sheridan's comedies'; Oliphant, Mrs. M., 'Sheridan' (New York 1883); Sichel, W. S., 'Sheridan' (from new and original material including a manuscript diary by Georgiana, Duchess of Devonshire, Boston 1909).

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SHERIDAN, Thomas, Irish clergyman, grandfather of Richard B. Sheridan (q.v.): b. County Cavan, Ireland, about 1684; d. Dublin, Ireland, 10 Sept. 1738. He was educated at Trinity College, Dublin; was at one time chaplain to the lord lieutenant and later secured a living through Dean Swift, of whom he was a close friend. He was noted for his wit and his gay carelessness, though his extravagance had reduced him to direst poverty. He wrote 'The Art of Punning,' translated Persius in prose and Sophocles' 'Philoctetes' in verse. His son THOMAS, elocutionist, father of Richard B. Sheridan, the dramatist (q.v.): b. near Dublin, Ireland, 1721; d. Margate, Kent, 14 Aug. 1788. He was educated at Trinity College, Dublin, became an actor and theatre manager and afterward was successful as a lecturer and teacher of elocution. He published 'Lectures on the Art of Reading' (1775); 'Dictionary of the English Language' (1780); 'Life of Dean Swift' (1784), etc.

SHERIDAN, Wyo., city and county-seat of Sheridan County, near the northern border of the State, 285 miles northwest of Cheyenne, on the Chicago, Burlington and Quincy Railroad. In this vicinity occurred three notable Indian battles, that at Wolf Creek under General Connor in 1865; the Fetterman fight on Massacre Hill in 1866, when all the whites were slain; and the Great Wagon Box fight in 1867. The place was settled in 1882 and incorporated in 1884. The State Hospital is located here. There are coal mines in the vicinity and the surrounding district is devoted to agriculture. Pop. (1920) 9,175.

SHERIF, shă-rēf, an Arabic title equivalent to noble. It is borne by the descendants of Mohammed, and descends both in the male and female line. Those who possess this rank are distinguished by green turbans and veils, green being the color of the Prophet. In India they are called Seyyed.

SHERIFF, an officer who represents the executive power of a county in the United States and is elected either by the legislature or the citizens. The requirements are controlled by statute, but usually they are that the person so elected must be over 21, a citizen of the United States and a resident of the county that he represents. Power to fill a vacancy occurring in the office of sheriff is regulated by statute. The sheriff is required to take a prescribed oath in order to qualify, and to furnish a bond for the faithful discharge of the duties of his office. The sheriff in person or by deputy executes civil and criminal process throughout the county; has charge of the prisoners, attends court and keeps the peace. His judicial authority is generally confined to ascertaining damages on writs of inquiry. He is not liable for any errors in acting in a judicial capacity — the office is almost exclusively ministerial. A sheriff has the right, when it is reasonably necessary, to lawfully summon any citizen for assistance in the execution of his duty, and one failing to obey the summons is liable to indictment; he has also the right to appoint general or special deputies in such manner as may be prescribed by his jurisdiction; but the sheriff cannot delegate his authority to appoint a deputy. The sheriff is liable for all damages caused by any wrongful act of his office, and may be criminally liable for a wilful breach of his duty, if a corrupt motive is shown. A sheriff's sale is one conducted by a sheriff, or by a person by him deputized, of property held under proper authority.

SHERLOCK HOLMES, Adventures of, a collection of stories by Sir A. Conan Doyle (q.v.), in each of which Holmes figures as a scientific amateur detective of remarkable skill. He is enslaved to cocaine and in manner is brusque and eccentric; but by a method of *a posteriori* reasoning, applied to apparently unimportant facts of common life, he is enabled to uncover most remote and disconnected causes. The tales are full of bizarre and often grewsome details; the principal characters, Holmes and his friend Dr. Watson, appear to have been suggested to the author by Poe's 'Murders in the Rue Morgue.' The first series appeared in the *Strand Magazine*, London, and in book form in 1891.

SHERMAN, Frank Dempster, American poet: b. Peekskill, N. Y., 6 May 1860; d. 19 Sept. 1916. He was graduated from Columbia in 1884 and subsequently studied at Harvard. For many years he was a professor of graphics at Columbia. He published 'Madrigals and Catches' (1887); 'Lyrics for a Lute' (1890); 'Little Folk Lyrics' (1892); 'Lyrics of Joy' (1904); 'A Southern Flight' (with Clinton Scollard, 1906); also several volumes of Sherman Family history.

SHERMAN, Henry Clapp, American chemist: b. Ashgrove, Va., 16 Oct. 1875. He was graduated at Maryland Agricultural College in 1893 and took his Ph.D. at Columbia University in 1897. He was investigator of nutrition for the United States Department of Agriculture in 1898–99; from 1897 was connected with the faculty at Columbia University, where he became professor of organic chemistry in 1907; and was head of the department of economy and food nutrition at Teachers' College 1909. He has been research member of Carnegie Institute since 1912. In 1915 he was major and member of the American Red Cross Mission to Russia. He edited the *School of Mines Quarterly* in 1906–09 and is author of 'Method of Organic Analysis' (1905; 2d ed., 1912); 'Chemistry of Food and Nutrition' (1911; 2d ed., 1916); 'Food Products' (1914); etc.

SHERMAN, James Schoolcraft, American politician and vice-president of the United States: b. New Hartford, N. Y., 24 Oct. 1855; d. Utica, N. Y., 30 Oct. 1912. He was graduated at Hamilton College in 1878, was admitted to the bar in 1880, and engaged in practice in Utica. He was mayor of Utica in 1884–85 and served in Congress in 1887–91 and 1893–1909. He was for many years promi-

nent in the affairs of the Republican party, was chairman of the Republican State Convention in 1895, 1900 and 1908, and in 1906 he was chairman of the Republican National Congressional Committee. He was elected vice-president of the United States in 1908, but died before the expiration of his term of office. He was renominated for the vice-presidency in 1912, but died a few days preceding the election. He was a trustee of Hamilton College.

SHERMAN, John, American statesman: b. Lancaster, Ohio, 10 May 1823; d. Washington, D. C., 22 Oct. 1900. He was the eighth child in a family of 11, being the junior by three years of his brother Gen. William Tecumseh Sherman (q.v.). He attended about two years at Homer Academy, Lancaster, Pa., between 1835–37. After having secured an irregular and not very complete general education, he studied law and was admitted to the bar at 21. In 1848 he was a delegate to the National Whig convention at Philadelphia. In the same year he married and established a mill for lumber work, which he carried on together with his law practice. He was president of the first Republican convention in Ohio, held at Columbus, 13 July 1855, which nominated Salmon P. Chase for governor. In 1855 he was elected a member of the 34th Congress. He took a prominent part in the proceedings of the House; was on the Committee of Inquiry sent to Kansas, and wrote the report of its investigations. He was prominently identified with the support of all measures for the prosecution of the Civil War; defended the protective tariff, and the refunding of the National debt. He was a member of the committee that visited Louisiana to supervise the counting of the returns of that State, and a member of the Electoral Commission. In Congress, Mr. Sherman quickly demonstrated his exceptional power as a master of finance. He watched carefully the appropriation bills, speedily extended the credit of the government, and provided for its future support. When Salmon P. Chase resigned the United States senatorship from Ohio to enter the Cabinet of President Lincoln, as Secretary of the Treasury, Mr. Sherman was elected his successor and took his seat 4 March 1861. In 1881 he was re-elected to the Senate, where he remained until 1897, when he was appointed Secretary of State by President McKinley. He resigned that office, however, in 1898, on account of failing health. He was a candidate for the Presidential nominations in 1884 and 1888. Among his publications are 'Selected Speeches and Reports on Finance and Taxation' (1879); and 'Recollections of Forty Years in the House, Senate, and Cabinet' (1893). From 1860 to 1900, there was scarcely a great financial measure with which the name of John Sherman was not connected. Among these were the making of United States treasury notes legal tender, the enacting of the national banking bill, the refunding act of 1870, and the resumption of specie payments. The detailed record of measures by which the legal tender notes of the government reached par, and by which specie resumption became an accomplished fact at the time fixed for it, exhibits the man under whose leadership this was done as a financier of the highest order. General Sherman was Secretary of the Treasury in Hayes' administration from March 1877 to March 1881. Consult 'The Sherman Letters: Correspondence between General and Senator Sherman from 1837 to 1891' (ed. by Rachel S. Thorndike, New York 1894); Burton, T. E., 'John Sherman' (New York 1906); Walker, A. H., 'History of the Sherman Law of the United States' (New York 1910).

SHERMAN, Lawrence Yates, American lawyer and senator: b. Miami County, Ohio, 8 Nov. 1856. He was graduated at McKendree College, Illinois, in 1882, was admitted to the bar and engaged in practice. He was judge of McDonough County in 1886–90; served in the Illinois legislature in 1897–1905, being speaker in 1899–1903, and leader of the Republican party in his State; and in 1905–09 he was lieutenant-governor of Illinois. He was president of the United States Board of Charities in 1909–13. He was sent to the United States Senate in 1912 to finish the unexpired term of William Lorimer, and was afterward elected for the term 1915–21.

SHERMAN, Roger, American legislator: b. Newton, Mass., 19 April 1721; d. New Haven, Conn., 23 July 1793. He was apprenticed to a shoemaker when a child, but in 1743 he removed to New Milford, Conn., where he was engaged with his brother in keeping a small store. He studied law, politics and mathematics without a teacher, was appointed surveyor for his county in 1745 and for several years made the astronomical observations for an almanac published in New York. In 1754 he was admitted to the bar, served for several terms in the provincial assembly, and in 1761 removed to New Haven, Conn. He became judge of the Court of Common Pleas there in 1765 and served in that position and as judge of the Superior Court for 23 years. He was assistant governor in 1766–85, treasurer of Yale College in 1766–76, and a member of Congress from 1774–91, when he was elected senator in which capacity he served the remainder of his life. He was one of the committee of five to draft the Declaration of Independence which he afterward signed, was an active member of various war and ordnance committees, served on the treasury board and in 1777 was one of the framers of the original Articles of Confederation. He assisted in the codification of the laws of Connecticut, was a delegate to the Federal Constitutional Convention in 1787, where he played a prominent part, and from 1784 until his death was mayor of New Haven.

SHERMAN, William Tecumseh, American soldier: b. Lancaster, Ohio, 8 Feb. 1820; d. New York, 14 Feb. 1891; son of Judge Charles R. Sherman. His father died when he was about nine years old, and he was brought up in the family of Hon. Thomas Ewing, who procured for him an appointment as cadet at the United States Military Academy, West Point. He is described as having been at the time a tall, slim, loose-jointed lad, with red hair, fair, burned skin and piercing black eyes. In July 1840 he was graduated from the academy and appointed second lieutenant in the Third artillery, and first lieutenant Nov. 1841. He served in Florida until 1842, and was afterward in garrison at Fort Moultrie, S. C.

At the first rumor of war with Mexico he showed great impatience to be sent to Texas, but the War Department, instead, ordered him to California. The voyage appears to have made him strongly in favor of an interoceanic canal. He served in California as acting assistant adjutant-general of the department until February 1849, when he was transferred to similar duty on the staff of Gen. Persifor F. Smith who commanded the division of the Pacific. Having been ordered to New York as bearer of dispatches, he was married in January 1850 to Ellen Boyle, daughter of his foster-father, Hon. Thomas Ewing, then Secretary of the Interior.

In September 1850 Sherman was transferred to the commissary department with the rank of captain and stationed at Saint Louis and New Orleans. Shortly after his arrival at New Orleans he received notice of his appointment as partner in the banking firm of Lucas and Turner, a branch of Lucas and Simonds, of Saint Louis. Feeling that he could do better in business than in the army, he obtained a six months' leave of absence and started for California to represent the house. When the leave of absence expired he resigned from the army. Sherman at this time saw the danger of the slavery issue. "Unless people both North and South," he wrote in August 1856, "learn more moderation we'll see sights in the way of civil war."

Sherman removed to New York in 1857, and to Leavenworth, Kan., in 1858, where he practised law until July 1859, when he was elected superintendent of the proposed military academy in Louisiana. The institution was opened 1 Jan. 1860, as the Louisiana State Seminary of Learning and Military Academy, and Sherman remained its superintendent until 18 Jan. 1861, when he wrote to the governor asking to be relieved the moment the State determined to secede. His request having been granted, he went to Saint Louis in February 1861 and was for a short time president of a Saint Louis railroad company. While holding this place he was deeply interested in the approaching struggle between North and South, making valuable suggestions, some of which were shown by his brother, John Sherman, then in Congress, to Secretary of War Cameron. "On the necessity of maintaining a government, and that government the old constitutional one," he declared, "I have never wavered, but I do recoil from a war when the negro is the only question."

In May 1861 Sherman was appointed colonel of the 13th regular infantry, and 30 June he assumed command of a brigade of McDowell's army. He took an honorable part in the first battle of Bull Run; on 3 August received his commission as brigadier-general of volunteers, dating from 17 May, and 24 August was ordered to duty in the Department of the Cumberland, under Gen. Robert Anderson, whom he succeeded in command of the department 8 October. On the 26th of the same month he wrote that "to accomplish the only purpose for which Kentucky can be used there should be a force here of 200,000 men." In November Sherman, who was severely criticized by many for his assertions as to the number of men needed for the war in his section, was relieved of his command and sent to Missouri. After a short leave at home he was employed for a time as commander of the camp of instruction at Benton Barracks, near Saint Louis. In February 1862 he was transferred to Paducah, Ky., where he organized the division which he subsequently commanded at Shiloh. In this hard-fought, two-days' conflict Sherman was severely wounded, and Grant declared that "to his individual efforts I am indebted for the success of that battle." Sherman was commissioned major-general of volunteers, 1 May, and in the same month compelled the Confederates to evacuate Corinth, which was followed, in July, by the occupation of Memphis. His campaign against Vicksburg proved unfortunate. He was defeated and driven back to Chickasaw Bayou, but afterward rendered effective aid to Grant in the operations which resulted in the surrender of Vicksburg.

Sherman was made a brigadier-general of the regular army in July 1863. After the fall of Vicksburg and Port Hudson the Western armies lay comparatively idle for a time, and early in the autumn Sherman was occupied in rebuilding the Memphis and Charleston railroad to the East, that the armies might draw supplies by that route. While engaged on this work he was ordered to cross the Tennessee and march eastward. The battle of Chattanooga, in which he distinguished himself, followed, and he was next sent to the relief of Burnside, besieged by the Confederates in Knoxville. Sherman forced Longstreet to raise the siege 5 Dec. 1863. After a few weeks in winter quarters in northern Alabama, Sherman in January 1864 made a raid across the State of Mississippi from Jackson to Meridian and back again, doing a vast amount of damage to railways, Confederate property and the country at large. Grant being invited to take unhampered command of the military forces of the United States and to repeat, if possible, in the East, the successes which had attended his career in the West, assigned Sherman to the command of the Military Division of the Mississippi, including the Departments of the Ohio, the Tennessee, the Cumberland, and the Arkansas, with temporary headquarters at Nashville, and with orders to move on Atlanta. With an army of about 100,000 men Sherman invaded Georgia. He was opposed by Gen. Joseph E. Johnston, with about 45,000 Confederates in excellent spirit and discipline, but poorly provided with munitions of war, as compared with the Union forces. Johnston engaged Sherman's army at Dalton, Resaca, Cassville, Dallas and Kenesaw Mountain. At the last-named place, 27 June, the Confederates, owing to the shortness of artillery ammunition, reserved their cannon for the final charge of the Union troops, receiving them with a destructive fire which won the day for the South.

Sherman's progress, however, could not be stayed, and the Richmond government, believing that Johnston was not doing all that could be done with the men at his command, relieved him and put Hood in his place. Sharp battles followed in the vicinity of Atlanta, and at length Hood was compelled to evacuate the city during the night of 1 September. Sherman issued an order that all the inhabitants should leave Atlanta, going North or South as they

saw fit, and offered transportation to that end. Mayor Calhoun and other citizens appealed in vain to have the order recalled. «You cannot qualify war in harsher terms than I will,» answered Sherman, «war is cruelty and you cannot refine it.» The order was carried out and approved by the authorities at Washington. Sherman gave as his reasons to his military superiors that he wanted all the houses for military and storage purposes, and did not wish to be burdened with the care of the inhabitants.

Sherman became convinced, after a series of indecisive operations against Hood, that the aim of the latter was to draw him out of Georgia. He determined on marching to the sea, cutting a swath of devastation through the heart of the Confederacy and destroying, as far as possible, the sources of Confederate supplies. Grant fully approved of the plan, and Sherman, after burning Atlanta, breaking up the railway, and sending a part of his army to reinforce Thomas at Nashville, started with about 70,000 men on his memorable march. He ordered his troops to forage liberally on the country and although foraging was supposed to be done by regular details only, it was, in fact, carried on practically without restriction, and the devastation along the line of march was most complete. The Confederates had virtually no force to oppose Sherman's advance and when the governors of Alabama, South Carolina and Georgia were appealed to from Richmond, the first mentioned replied that none but cripples, women and children, and very old men were left in the State. Sherman entered Savannah 23 December, having lost on his march from Atlanta, 103 killed, 428 wounded and 278 missing. Congress, 10 Jan. 1865, tendered the thanks of the people of the United States to Sherman and his command. He moved northward 1 February and occupied Columbia 17 February, the place being destroyed by a conflagration for which Sherman always claimed that he was not responsible.

General Johnston was recalled to command by the chiefs of the sinking Confederacy, and after several desperate encounters, Sherman and Johnston met at Durham Station, N. C., 18 April. The terms agreed upon were most liberal to the Confederates allowing them to deposit their arms at their State capitals, and providing for the recognition of their State governments. The terms were made subject to the approval of superior authority, and a suspension of hostilities was agreed upon to obtain that consent, 48 hours' notice to be given by either side before resuming hostilities. Lincoln had been murdered; there was a vindictive feeling toward the South at Washington, and Johnson and his Cabinet wholly disapproved Sherman's arrangement, and ordered Grant to take charge of Sherman's command. Grant, always generous in his recognition of Sherman's merits went to Raleigh, as directed, but left to Sherman the honor of receiving Johnston's surrender on the same terms as those granted to Lee. Sherman keenly felt what he regarded as unjust treatment on this occasion by Secretary of War Stanton and declined publicly to take Stanton's proffered hand at the great army review in Washington 24 May 1865.

Sherman was appointed to command the military division of the Mississippi 27 June 1865; promoted to lieutenant-general 25 July 1866, and assigned in August to the Military Division of the Missouri. On the accession of Grant to the Presidency, Sherman succeeded to the command of the army as general. About this time he wrote «I do think some political power might be given to the young men who served in the rebel army, for they are a better class than the adventurers who have gone South purely for office.» Sherman retired 8 Feb. 1884, taking, to the last, an active interest in public affairs. A splendid equestrian statue, by Saint Gaudens, presenting Sherman in characteristic attitude as when he rode at the head of his army, was unveiled at the southeastern entrance of Central Park, New York, in 1903, and another handsome equestrian statue of the great general was dedicated in Washington the same year, President Roosevelt taking part in the ceremonies. The Washington statue stands on the spot whence Sherman reviewed the grand march of the Union army in 1865.

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SHERMAN, Tex., city, county-seat of Grayson County, on the Houston and Texas Central Railway, on the Missouri, Kansas and Texas Railway of Texas; Saint Louis and Southwestern Railway; Missouri, Oklahoma and Gulf Railway; Saint Louis and San Francisco Railway; Texas and Pacific Railway and the Texas Traction Company; 12 miles south of the Red River and 728 feet above the sea. Sherman is in the Red River Valley and is the home of the Red River Valley Fair, said to be the largest free fair in America. The northern half of Grayson is sandy loam, and from it large quantities of fruit and vegetables are raised and shipped, while the southern half is of the black waxy type, especially suited for cotton and grain farming. The breeding of registered horses, cattle and hogs is practised extensively and with profit in all parts of the county. The city is the most accessible point in north Texas having 108 passenger trains, interurban and motor cars over the railroad lines in and out daily. There are 350 miles of piked highways in Grayson County which radiate out of Sherman. One of the greatest Oklahoma oil fields is just across the Red River from Grayson County. As one of the leading manufacturing cities of Texas, Sherman turns out $25,691,000 worth of goods per year. Among the products manufactured are cigars, candy, medicines, overalls, cotton duck, creamery butter, and more grains, cotton and oil products than any other point in Texas. The laundries of the city are said to cover a larger area of outside business than those of any other State. The educational institutions are the Austin College, State Presbyterian College for boys, Kidd-Key College and Conservatory of Music, Saint Joseph's Academy, Catholic School for girls and the Sherman Business College. Sherman has also an excellent public school system for both races; and $100,000 bonds are being issued to add to the present high school. There are two hospitals, Saint Vincent's Sanitarium and the Sherman Hospital, both being well-equipped institutions. There has recently been left to Sherman $100,000 by Wilson N. Jones, former governor of Oklahoma, for the purpose of providing hospital facilities for the sick poor. Among the public buildings of note are the Federal building, the Carnegie library, the Sherman Hall at the Austin College and the Y. M. C. A. building. The combined assets of the banks of Sherman total $9,562,364. Council-commission-manager form of government was adopted in 1915 and is proving very successful. Pop. about 15,000.

SHERMAN ACT, an act of the United States Congress, approved 14 July 1890. It was the culmination of a long disagreement between the two houses over a financial policy, neither side being disposed to yield. This bill was supported by Senator Sherman and others as a compromise measure. It instructed the Secretary of the Treasury to buy silver bullion to the amount of 4,500,000 ounces a month, and to issue treasury notes in payment. Though the bill was approved, the financial policy continued to be a disturbing question and arguments favoring a repeal were presented at almost every opportunity. The business depression of the summer of 1893 was alleged to be a consequence of the bill, and President Cleveland summoned Congress to convene in special session, 7 August. A bill to repeal the silver-purchasing proviso of the Sherman Act passed the House 28 August. In the Senate, the Voorhees bill was presented as a substitute, its provisions being a repeal of the silver-purchasing clause, but affirming bimetallism as a national policy. After a protracted contest the Voorhees bill passed the Senate 30 October. It was concurred in by the House 1 November, and the President approved it the same day.

SHERRILL, Charles Hitchcock, American lawyer: b. Washington, 13 April 1867. He received his education at Yale, being admitted to the bar in 1891. In 1909 he became United States Minister to Argentina, but, although later offered the ambassadorship to Japan, ill-health forced him to refuse the post, and in 1912 he resumed the practice of law. He became adjutant-general of New York State a few years later. He is the author of 'Stained Glass Tours in France' (1908); 'Stained Glass Tours in England' (1909); 'French Memories of 18th Century America' (1915); 'Modernizing of the Monroe Doctrine' (1916).

SHERRY, a favorite Spanish wine, so called because chiefly produced in the neighborhood of Xeres de la Frontera, near Cadiz, in Andalusia, Spain. Unlike many of the French wines, the manufacture of sherry is carried on chiefly by a few large concerns. The industry has principally passed to French and British proprietors, who have greatly improved the manufacture and have bettered the grade of commercial sherries. The best soil consists chiefly of carbonate of lime, with a small admixture of silex and clay, and occasionally magnesia. Red and white grapes are used indiscriminately. When ripe and gathered they are spread on mats, and left to dry for two or three days; they are then freed from the stalks, and the rotten or unripe berries rejected. Being now introduced into vats, with a layer of burned gypsum on the surface, they are trodden by peasants with wooden shoes. The juice is collected in casks, in which the fermentation is allowed to take place, continuing generally from October till the beginning or middle of December. The wines are then racked from the lees, and those intended for exportation receive additions of brandy, seldom more than three or four gallons to the butt. The new wine is harsh and fiery, but mellows by being allowed to remain in the wood four or five years, though 15 or 20 years are required to perfect its flavor. Sometimes bitter almonds are infused to give the wine a nutty flavor. The dry sherry, that which is least sweet, is the most esteemed. The finest variety of sherry is the Manzanilla sherry, the excellent qualities of which are determined by the nature of the soil and the lay of the district in which it is grown; Amontillado and Montilla sherries and Vino de Pasta are also highly esteemed. The sherry wines are shipped for the most part at Cadiz, and are principally exported to England. No wine is more largely imitated and adulterated than sherry. See LIQUOR AND THE LIQUOR TRAFFIC; WINE AND WINE MAKING.

SHERWOOD, William Hall, American pianist: b. Lyons, N. Y., 31 Jan. 1854; d. Chicago, Ill., 7 Jan. 1911. He appeared in concerts at the age of nine years and later studied under William Mason. In 1871–76 he studied in Europe under Kullak, Richter, Doppler and Weitzman. He appeared as a performer at the Beethoven Festival at Berlin and with Liszt at Weimar and received flattering offers to remain abroad. He returned to the United States in 1876 and settled in Boston teaching music at the New England Conservatory, and after 1889 he lived in Chicago, where he was head of the Chicago Conservatory until 1897; he then resigned to establish the Sherwood Piano School. He was widely known as a concert pianist, and gave recitals in all the larger cities of the United States.

SHERWOOD FOREST, an ancient forest in the west of Nottinghamshire, England, in a hilly district between Nottingham and Worksop. The tract covered about 200 square miles and was formerly a royal forest, famous as the scene of the exploits of Robin Hood and his merry men, many legends of whom are yet to be heard in the surrounding country. Only a small portion of the forest, near Rotterham, still remains. The rest of the country it once covered is now occupied by country-seats and private parks, and is for the most part bare of trees. The town of Mansfield and several villages are within the ancient bounds, which were about 25 miles from north to south and six to

eight miles from east to west. Consult works by Sissons (1888) and White, R., 1875.

SHETLAND, or **ZETLAND,** Scotland, a county embracing the group of more than 100 islands, islets and skerries northeast of Orkney, of which 27 are inhabited. They form the northernmost county of Scotland; the capital, Lerwick, is 116 miles northeast of Kirkwall, 300 miles north by east of Edinburgh, and 223 miles west of Bergen, Norway. The islands extend 70 miles and 36 miles in extreme breadth. They contain 566 square miles, and the largest are Mainland, Yell, Unst, Fetlar, Bressay, Whalsay and Foula. Mainland contains about two-thirds of the entire acreage; its surface is hilly with indented coast line and interspersed by numerous lochs. Ronas Hill (1,475 feet) is the highest point in the northwest of Mainland: The Sneug (1,372 feet), in Foula, is next in height. The coasts of the whole group are bold and rocky, presenting some fine landscape. Peat moss covers much of the surface, and some cereal crops and vegetables are grown. The pastures cover about 43,000 acres. Domestic animals are reared — the small Shetland ponies are well known — but the chief industry consists in the herring fisheries. The manufactures are mainly woolens. The capital, Lerwick, is on Bressay Sound, and Scalloway, the largest village,— both in Mainland. The exports are fish, oil, cattle, horses, eggs and gloves. There are 61 public schools, church schools and several schools for superior education. The inhabitants are of Norse extraction and were for several centuries under Scandinavian sovereignties. Norse was still spoken in Foula at the end of the 18th century. Since 1468 the islands have belonged to Scotland. There are numerous antiquities which are highly interesting, including brochs, standing-stones, tumuli and the ruins of a Roman camp on Fetlar Island. Pop. about 28,000.

SHEWBREAD, shō'brĕd, the 12 unleavened loaves placed upon a table in the outer department of the Jewish sanctuary. The number 12 represented the 12 tribes. The loaves were placed in two piles, one above another, and were changed every Sabbath day by the priests. The removed bread became the property of the priests, who alone had a right to eat of it, and only in the holy place. In cases of emergency, however, they incurred no blame by giving it to persons who were in a state of ceremonial purity, as in the instance of David and his men (1 Sam. xxi, 4–6; Matt. xii, 4).

SHIAHS, shē'as. See RELIGIOUS SECTS; SHIITES.

SHIBBOLETH, a word which on a certain occasion served as a test to distinguish Ephraimites from Gibeonites. Jephtha's men, Gibeonites, held the ford of Jordan, with orders to suffer no Ephraimite to cross over. When challenged with the question "Art thou an Ephraimite?" the man of Ephraim would answer "Nay." "Say now Shibboleth"; and the other pronounced it "Sibboleth," "for he could not frame to pronounce it right." In the Septuagint version, which is followed by the Latin Vulgate, the "point" of the question is completely lost: "Art thou not an Ephraimite?" and they said "Nay." And they said to him, "Then say *stachys,*" that is, "say ear" (of corn), which is the etymological meaning of the Hebrew word shibboleth: "and he framed not to speak so."

SHIBUSAWA, shē'boo-sä'wa, **Ei-ichi,** BARON, Japanese banker: b. Saitama prefecture, 2 Feb. 1840. He entered government service at Tokio under the Tokugawa Shogunate when still a youth, and traveled in Europe in 1867–68 as companion to one of the Tokugawa princes. Upon the establishment of the Imperial government in 1869 he was appointed to a high office in the Treasury, but resigned in 1873 because of a disagreement concerning the fixing of expenditures for the government departments, and held no other government position, despite frequent offers. He founded the first national bank, known as the First Bank, in 1873, and became a power in the Japanese financial world. He established a commercial training school, out of which grew the Tokio Higher Commercial School; inaugurated the Tokio Chamber of Commerce in 1878, and served as its chairman until 1905, when illness forced his retirement from business. He returned to active life for a short time after the Russo-Japanese War. He first visited the United States in 1902, and re-visited it in 1909 and 1915. For his many public services he was created baron in 1900.

SHIELD, shēld, **William,** English composer: b. Swalwall, Durham, 5 March 1748; d. London, 25 Jan. 1829. The son of a singing master, he early studied music and composed anthems that were sung in Durham cathedral. His earliest sustained work was a comic opera, 'The Flitch of Bacon' (1778), and having been appointed composer to Covent Garden (1778–97) he produced several other works, including 'Rosina' (1783); 'The Poor Soldier,' (1784); 'The Woodman' (1792); 'Two Faces Under a Hood' (1807). But he is best known by his songs, among which are 'The Heaving of the Lead'; 'The Arethusa'; 'The Thorn'; 'O bring me wine'; 'The Ploughboy'; and 'The Wolf.' The tune of 'Auld Lang Syne,' as now sung, was introduced into his 'Rosina'; the authorship of 'Coming through the Rye' has also been claimed for Shield. Among his literary works are 'An Introduction to Harmony' (1817); and 'Rudiments of Thorough Bass.' In 1817 Shield was appointed 'Master of the King's Musick.' His productions comprise upwards of 30 dramatic pieces, several collections of glees, ballads, trios, etc. He is buried in the south cloister of Westminster Abbey. Consult 'Dictionary of National Biography' (Vol. 52, London 1897); Grove's 'Dictionary of Music' (ib. 1911); Robinson, J., 'Life of William Shield' (Newcastle 1891).

SHIELDS, shēldz, **Charles Woodruff,** American educator: b. New Albany, Ind., 4 April 1825; d. Newport, R. I., 26 Aug. 1904. He was graduated from Princeton in 1844, from the Theological Seminary there in 1847, was ordained in the Presbyterian ministry and served in charge of pastorates at Hempstead, L. I., in 1849–50, and in Philadelphia in 1860–65. He later occupied the chair of harmony of science and revealed religion at Princeton. His publications include 'The Presbyterian Book of Common Prayer according to the Revision of the Westminster Divines' (1864); 'Religion and Science in Relation to Philosophy' (1875); 'The Order of the Sciences' (1882); 'The United Church of the United States' (1896); 'The Scientific Evidences of Revealed Religion' (1900), etc.

SHIELDS, James, American military officer: b. Dungannon, Ireland, 1810; d. Ottumwa, Iowa, 1 June 1879. He came to the United States in 1826 and entering the army subsequently served through the Mexican War and for bravery in the battles of Cerro Gordo and Chapultepec was brevetted major-general. He was United States senator from Illinois in 1849 and from Minnesota in 1857. During the Civil War he especially distinguished himself by defeating "Stonewall" Jackson at Winchester, 23 March 1862. He was defeated at Port Republic 9 June 1862 and resigned his commission in 1863.

SHIELDS, John Knight, American lawyer, jurist and senator: b. Clinchdale, Tenn., 15 Aug. 1858. He was privately educated and was admitted to the bar in 1879, practising thereafter at Knoxville, Tenn. He became associate justice of the Supreme Court of Tennessee in 1902, and was chief justice of that court in 1910–13. He was elected to the United States Senate in 1913 and was re-elected for the term 1919–25.

SHIELDS, England, the urban aggregation of North and South Shields, two separate municipalities and important seaports in Northumberland and Durham respectively, on opposite banks of the Tyne, near its mouth in the North Sea. The port of Shields, formed by an expansion of the river into a wide bay, has been greatly improved and deepened by dredging and the construction of piers, and accommodates vessels of any size at their quays. There is a very extensive trade, particularly in coal, of which more than 2,500,000 tons were shipped a year before the war.

NORTH SHIELDS, on the north bank of the Tyne, forms part of the municipality and parliamentary borough of Tynemouth (q.v.) together with three small townships. It extends about one mile along the river, and consists of an old and a modern portion, the former with narrow streets and lanes, and the latter with spacious streets and squares. The township extends up the river to Willington, and includes Northumberland Dock and Albert Edward Dock. The chief industrial establishments are shipbuilding yards, saltworks, iron foundries, marine-engine works, and electrical works. Fishing is largely carried on, and much fish is sent to many parts of England. Pop. 59,000.

SOUTH SHIELDS, opposite North Shields, communicates with the latter by steam-ferries. The Saint Hilda coal-mine in the town was opened in 1810. The old part of the town consists of long narrow streets running parallel to the river; but the modern part, immediately behind, occupies a higher site and possesses many handsome buildings. The public institutions include a town hall, police buildings (1893), a custom-house, free library and museum, infirmary, fever hospital, public baths and washhouses; nautical college, national and other schools and several benevolent endowments. The harbor is lined with ship and boat yards and factories. The chief industries are coal-mining and coal shipments, shipbuilding and ship-repairing, marine-engine and boiler-making, and the manufacture of glass, earthenware, chain-cables, rope and anchors. Coal is shipped principally at the Tyre docks, area, 50 acres, belonging to the North-Eastern Railway Company. The first lifeboat was built in South Shields and put to sea 30 Jan. 1790. A stone pier a mile long has been constructed at the mouth of the harbor. Pop. 108,647.

SHIELDS. Weapons of defense held before the bearer to protect against blows or projectiles. The shield has been probably universally used by all nations and tribes from that early period when the human being needed an outdoor defense. The early Greeks had their circular shield (*aspis*) of leather or felt, and the *sakos* or oval shield. The ancient descriptions show how these shields were beautified, as the metal one of Achilles made by Hephaistos (according to Homer) with its embossed scenes, that of Heracles in Hesiod's description. Often they had individual badges painted on them (forerunners of the knights' heraldic shields), a custom borrowed from the Persians. The Romans, Diodorus says, at first used square shields, then the *aspis,* and later the large circular iron *clypeus* and the four cornered four-foot-long *scutum,* of wood. Later the light circular *parma* of leather was used by the *velites.* Old Roman bas-reliefs show us also hexagonal shields. The shields of the Gauls (*pavoises*) were so great they crossed rivers in them. The shield of the crusaders was pointed (*heater*-shape). The English buckler and the Scotch targe are old subjects for painters and poets. The shields of the knights or of heraldry are very varied in form changing with the different periods and methods of combat. The "heater" shape was in use in the 12th, 13th and 14th centuries; in the 14th century the sides often ran parallel, the top was still a straight line but the bottom was almost a half round. Then the tilting shields began to appear and indentations were made in the side (termed "bouches") to allow for the passage of the lance, these were very much smaller than the triangular shield of the warrior on foot. But the actual shield of the knight soon passed into the art of heraldry, to be known generally as a *scutcheon,* and assumed fantastic shapes that were never seen in combats; even the distaff (woman) side of the "house" receiving a shield of "lozenge" (diamond) form. A very natural evolution from the decorative shield of heraldry was that to the shield as an accessory in ornament, when it took the place of the *cartouche.* In the decorative arts the shields are endless in form, their decorative curling and curving straps being derived from the metalworkers' beaten cartouches worked up to ornament the gates and doors of the different periods. Perhaps the most extravagantly decorative shield forms are those of the Renaissance, baroque, and rococo periods. Shields have been much utilized as a motif by artists in their decorative "trophy" groupings, and to the present day there is no more favored device in every branch of Art, including architecture, than the shield form.

CLEMENT W. COUMBE,
Technical Art Expert.

SHIITES, shē'its, or **SHIAH,** that sect or party of Mohammedans who assert the rights of Ali (q.v.), the son-in-law of the Prophet, and his descendants to be the true line of

Caliphs, as opposed to the Sunni or Sunnites (q.v.), who uphold the succession of the Caliphs Abu Bekr. The divergence — not unmixed with animosity — that exists between the two sects is similar to that of Protestants and Roman Catholics of former times, and constitutes even to-day the weakest point in the armor of Islam. The Persians and most of the Moslems in India are Shiites, while the Turks and many Arabs adhere mainly to the Sunni faction. The Persians adopted the Shiah doctrines in 1500, since when they have been the national law and religion of that country. Yet neither creed is pure and unadulterated, for each is again subdivided into smaller schisms. (See HASAN and HUSAIN; MOHAMMED; OMMIADS). Consult Muir, W., 'The Life of Mohammed' and 'The Caliphate' (London).

SHIKARPUR, shĭk-är-poor', India, (1) a former district in Sind, Bombay, comprising the four subdivisions of Rohri, Sukkur, Larkana and Mehar. The two first now form the Sukkur district and the other two (since 1901) the district of Larkana. (2) A subdivision of the Sukkur district (see above), composed of the Shikarpur, Naushahro Abro and Sukkur *talukas* or departments. (3) Shikarpur Taluka of Sukkur district, Sind, Bombay, has an area of 492 square miles and a population of about 110,000. It contains one town, Shikarpur (see below) and 88 villages. (4) Town, headquarters of the *taluka* of the same name in Sukkur district, stands in a tract of low-lying country which is annually flooded by canals from the Indus (18 miles west). The soil is rich, producing grain and fruit. Its buildings have been much improved in recent years. There is a famous bazaar with a flourishing trade, owing to the town's position on one of the great routes from Sind to Khorassan *via* the Bolan Pass. There are 17 government schools — one high school, 12 for boys and four for girls (two each for Hindus and Mohammedans), and several private schools (one English). The principal manufactures are carpets and coarse cottons; the more important exports are indigo, metals, henna, spices, groceries, opium, horsecloths, dry grains and silks. Since the Municipal Act of 1855 great sanitary improvements have been effected. Pop. 53,944, about one-third Mohammedans and the rest Hindus. (5) Shikarpur Taluk, the northern department of Shimogo district, Mysore; area, 429 square miles; pop. about 70,000. The jungle harbors tigers; leopards and other wild animals. The headquarters is also named (6) Shikarpur Town; pop. 5,568. (7) A town in the district of Bulandshahr, United Provinces; pop. about 13,000. The American Methodists maintain a branch mission here.

SHILKA, shĭl'kä, a river of Asia, in eastern Siberia, rises among the Yablonoi Mountains and is one of the two rivers (the other is the Argun) which by their union form the Amur, into which it empties at a point beyond Ust Strelka. The Shilka flows from Mount Kentai in the Khan-ula range (Chinese Mongolia) mostly through Russian territory, before reaching which it is known as the Onon. It is about 320 miles long and navigable about one-half of the year. In winter its frozen bed is utilized as a highway. Sretensk is an important station on the river for vessels going to Khabarovsk. It is a terminus of the Trans-Siberian Railway and the starting point of Russian expeditions to the Lower Amur.

SHILLABER, shĭl'a-bẽr, **Benjamin Penhallow**, «MRS. PARTINGTON,» American humorist: b. Portsmouth, N. H., 12 July 1814; d. Chelsea, Mass., 25 Nov. 1890. After a brief secondary schooling and training in a local printer's office, he went to Boston, where he followed his trade in several newspaper offices, with the interruption of a year's visit to British Guiana. Then he began journalistic work. Achieving from the first (1847) a great success with his 'Sayings of Mrs. Partington,' whose homely wisdom is closely allied to that of the Widow Bedott. In Boston he was successively an editor of the *Post* and editor-in-chief of the *Carpet-Bag*, a humorous publication of short-lived fame, and of the *Saturday Evening Gazette* (1856–66). Shillaber's work was not, as one critic has phrased it, «trained to move in literary circles,» but in that it was similar to most American humor of its period. Among the titles of his books are 'Rhymes with Reason and without' (1852); 'Life and Sayings of Mrs. Partington' (1853); 'Mrs. Partington's Knitting Work' (1857); 'Partingtonian Patchwork' (1872); 'Lines in Pleasant Places' (1875); 'Ike and his friend' (1879); and 'Cruises with Captain Bob' (1880); 'Wideswathe' (1884).

SHILLELAGH, shĭ-lā'lä, the cudgel of blackthorn or oak carried by the conventional Irishman, with which he is supposed to delight to play on the heads of his friends on occasion. The name is borrowed from the once famous oak forest of Shillelagh in the southwest corner of County Wicklow, 17 miles southwest of Aughrim. There are about 12 ways of spelling this word.

SHILLING, the name of an English silver coin and money of account since the Norman Conquest, of the value of 12 pence, or the 20th part of a sovereign or pound sterling; and equivalent in the United States to about 24⅓ cents. In the United States, a denomination of money formerly in use, differing in value relatively to the dollar in different States, but below that of the English shilling with a corresponding value for the penny and the pound. An exhaustive history of the shilling may be found in the great Oxford Dictionary of Sir J. A. H. Murray (1888 et seq.).

SHILOH, shĭ'lō, (1) Palestine, occupied the summit of a high mountain north of Bethel. Its modern name is Seilun. The Ark of the Covenant or Tabernacle (q.v.) rested here from the time of Joshua to that of Eli, when it was carried away by the Philistines. Prior to this Shiloh was the religious seat of the Israelites and a great feast was held annually. The phrase of the Scriptures, «until Shiloh come,» has received considerable attention from theologians, and its accepted interpretation is— «until Christ come,» or «until rest come.» A small village site, 20 miles north of Jerusalem, is identified with the ancient Shiloh. (2) A settlement in Cape Colony, South Africa, in the district of Queenstown, 60 miles northwest by west of King William's Town. (3) There is one village of this name in Alaska and there are 16 in the United States.

SHILOH, shĭ'lō (Tenn.), **Battle of.** This engagement, known also as Pittsburgh Landing, was fought 6–7 April 1862, between the Union forces of General Grant, commanding the Army of the Tennessee, and of General Buell, commanding the Army of the Ohio — the latter arriving the night of the first day — and the Confederate Army of the Mississippi under Gen. A. Sidney Johnston, with Gen. P. G. T. Beauregard second in command.

After the battles of Mill Springs and Fort Donelson (qq.v.) Johnston withdrew from Kentucky and Tennessee to the line of the Memphis and Charleston Railroad, and soon after concentrated his army at Corinth, Miss. The Union forces were sent up the Tennessee River under Gen. C. F. Smith, Grant having been ordered by General Halleck to remain at Fort Henry (q.v.), Gen. W. T. Sherman, commanding the advance and seeking to cut the railroad, finding the country above Pittsburgh Landing under water, fell back to that point, and recommended its occupation to General Smith, who had remained at Savannah. Sherman established his division 19 March at Shiloh Church, about two and a half miles back from the Landing, General Hurlbut's division having been encamped one mile out from the river. Grant, having been restored to command, reached Savannah 17 March and sent McClernand's and C. F. Smith's division under W. H. L. Wallace to Pittsburgh. Prentiss' division followed later. Little or no attention was paid to lines of battle or reserves, both Grant and Sherman looking upon the concentration as preparatory to an advance upon Corinth. Gen. Lew Wallace's division was established at Crump's Landing, some six miles below, where, as Grant explained to Halleck, he had a good road which would enable him «to form a junction with the main column, . . . six or seven miles before reaching Corinth.»

In regard to this move, Halleck, 20 March, telegraphed: «By all means keep your forces together until you connect with General Buell, and wait till you are properly fortified and receive orders.» No attention was paid to this direction as to fortifying, and neither abatis nor rifle-pits were constructed, nor timber felled. Grant in his 'Memoirs' says of this, «When all reinforcements should have arrived I expected to take the initiative by marching on Corinth, and had no expectation of needing fortifications, though this subject was taken into consideration.» The further reason given by Grant was that the proper line for fortifying was in rear of the camps as they ran, and could not be easily supplied with water. Sherman, in his 'Memoirs,' writes: «We did not fortify our camps against an attack, because we had no orders to do so, and because such a course would have made our raw men timid»; and in a court-martial case he testified: «To have erected fortifications would have been an evidence of weakness, and would have invited an attack.» There was no expectation of an attack. Grant, in his 'Memoirs,' says: «The fact is, I regarded the campaign we were engaged in as an offensive one, and had no idea that the enemy would leave strong intrenchments to take the initiative when he knew he would be attacked where he was if he remained.» General Nelson, the advance of Buell on the march from Columbia, telegraphed Grant on 3 April that he could be at Savannah 5 April, and in reply was informed Friday, 4 April, that he need not hurry, as boats could not be ready to take him to Pittsburgh until the 8th. The same day Grant notified General Prentiss: «The review of your division will not take place until Tuesday next.» Two days before the time fixed for review Prentiss and his division were prisoners in the hands of the enemy. This conviction that there would be no attack led not only to neglecting all defensive preparations, but to selecting camp-grounds without regard to a line of battle and chiefly with reference to available ground and the convenience of water. Three of Sherman's brigades were established about Shiloh Church and the fourth two miles distant. This wide space was later filled in part by Prentiss' division, leaving extensive gaps on each of his flanks. According to maps of both Grant and Sherman, McClernand's division was camped to the left and rear of Sherman, and nearly at right angles to the latter, with its flank toward the enemy's position. Hurlbut's division was a mile in rear of Prentiss, and W. H. L. Wallace's about the same in rear of Sherman.

There had been a considerable show of Confederate cavalry several miles to the front 4 April, but on the 5th Sherman wrote Grant: «All is quiet along my lines now. We are in the act of exchanging cavalry according to your order. The enemy has cavalry in our front, and I think there are two regiments and one battery six miles out.» The same day one of his regiments had been engaged under his orders in cutting a road and bridging a creek in his front for the advance on Corinth. Later in the day Sherman wrote Grant: «I have no doubt that nothing will occur to-day more than some picket-firing,» and that he did not «apprehend anything like an attack» on his position. The same day, after Sherman's report from the front, Grant, who had gone back to Savannah for the night, telegraphed Halleck: «I have scarcely the faintest idea of an attack (general one) being made upon us, but will be prepared should such a thing take place. General Nelson's division has arrived. The other two of General Buell's column will arrive to-morrow and next day. It is my present intention to send them to Hamburg, some four miles above Pittsburgh, when they all get here. From that point to Corinth the road is good, and a junction can be formed with the troops from Pittsburgh at almost any point.» Grant, the same day, telegraphed Buell: «The enemy at and near Corinth are probably from 60,000 to 80,000.»

At the very time of these various interchanges of opinion Hardee's corps was in line of battle within a mile and a half of Sherman's headquarters, having deployed in this position at 10 A.M., 5 April, with General Bragg's corps forming as a second line, and Polk's and Breckinridge's corps, the rear of Johnston's army, closing up. The Confederate army had marched from Corinth the morning of 3 April, expecting to attack Saturday morning, the 5th, but a heavy storm and other causes delayed so that the attack was postponed till Sunday morning, the 6th. Such was the situation Saturday night in the Union camps. While there was a very general feeling among the pickets and

many subordinate officers that the enemy was near in considerable force, it was discredited by Sherman, and so the usual precautionary orders were not given to medical, ordnance, quartermaster, or commissary officers, or to the troops, and no one had any official intimation that a battle was impending, or knew that Johnston's entire army was close to their front awaiting daylight to attack. There had been some strengthening of pickets, but nothing was done which even the suspected presence of the Confederate army would have called for.

General Prentiss, after the war, in the first public utterance on the question of surprise, said: "In reference to the still general inquiry, 'Was our army surprised at Shiloh?' I can only reply for myself that I had not the slightest idea that a general engagement was to be fought that day." He said further: "We were not prepared on the 6th of April"; but "admonished by the action of the enemy on Friday evening," he had strengthened his pickets.

Gen. Andrew Hickenlooper, now one of the principal officers of the Society of the Army of the Tennessee, an officer of note in Grant's army throughout the war, and a strong friend of Grant and Sherman ever after, commanded a battery in Prentiss' division at Shiloh. In the course of an exhaustive review of the battle he says of the general situation: "There had been no order or system in camping; no relation of one command to another; no defined front or known rear, except an impassable river. There was no common directing head or superior officer beyond the rank of division commander placed on the firing line, whom all would recognize and promptly obey." . . . "The night before had been passed by the Union troops in merry-making until the camp sank into a peaceful slumber, from which they were aroused by the roar of musketry and the booming of the guns of the Fifth Battery." As to the early hours of the day of battle, he observes: "The bugle's cheery notes aroused the camp at the dawn of day; breakfast was over, and all was ready for an early morning drill, when the faint reports of distant picket-shots were heard and then came the pattering fire of the reserves, . . . followed by volleys on the right that told of swiftly approaching danger." The pickets of Prentiss were the first to encounter the Confederate advance, and being strongly reinforced, they attacked Hardee's oncoming line. The latter pushed rapidly forward and thrust strong flanking forces into the wide gaps on Prentiss' flanks, thus turning both, as well as Sherman's left, and the right of Stuart — Sherman's isolated brigade.

Sherman's brigades formed on their colorline, a portion of the troops being called from their breakfast for the purpose. They advanced between 200 and 300 yards, met the enemy in force and checked his advance for a time, Sherman meantime sending to McClernand for a battalion of cavalry to join one of his "for the purpose of discovering the strength and design of the enemy." It was not until 8 o'clock, however, that Sherman became convinced that it was an attack in force. He thus fixes the time in his official report: "About 8 A.M. I saw the glistening bayonets of heavy masses of infantry to our left front in the woods beyond the small stream alluded to, and became satisfied for the first time that the enemy designed a determined attack on our whole camp." At 10 o'clock most of the advanced Union camps were in the hands of the enemy. There had been no time to strike tents or remove stores or private baggage. Sherman relates that two of his horses were killed at the picket-rope, and that he found them still tied there when the camps were recovered the next day.

In spite of this general surprise and of the tremendous onslaught of solidly formed battle-lines, there was throughout the day much stubborn and even remarkable fighting, in which Sherman, Prentiss, McClernand and Hurlbut were personally conspicuous. After the battle began, Sherman's conduct was beyond praise. There were probably 20,000 men in regiments that maintained their shattered organizations, and in broken groups, in batteries, and in mixed forces rallied by brave officers and men, which, together, without special regard to lines, held with desperate courage against the enveloping enemy. Many of them were killed or wounded before the day ended. But nothing could permanently resist the well-ordered Confederate movement. Grant wrote that when he met Buell at the Landing, which was at 1 P.M., "there probably were as many as four or five thousand stragglers lying under cover of the river bluff, panic-stricken, most of whom would have been shot where they lay, without resistance, before they would have taken muskets and marched to the front to protect themselves."

As the day advanced, the Union line was fast disintegrating. Sherman, testifying under oath at a subsequent trial, said that "at least 10,000 ran away." Prentiss' division was surrendered and captured soon after 5 P.M., having fought and maintained its organization to the last, and given the best illustration of pluck, endurance, and persistence in fighting that the history of the first day affords. Sherman's organization was destroyed, and he, with a small force of his own, was fighting stubbornly with McClernand, whose organization, though much broken, was still maintained. About 2 P. M. Johnston was wounded, and died in half an hour. The transfer of command to General Beauregard caused a lull in the fight, and a delay in movement, but at 5 the Union line had been forced back into a corner between the Tennessee River and Snake Creek, an area which included the landing. Here the line presented a front of about a mile and a half to the enemy. Just as an assault on this position was being delivered at the right of the Confederate lines, Ammen's brigade of Nelson's division of Buell's army, which had marched from Savannah through the swamps, was ferried across the river, and two regiments advanced and opened fire upon the right regiments of the enemy, which, in charging forward, had nearly reached the landing. The assault was checked without severe fighting, but the arrival of fresh troops thus became known, and the Confederate attack ended for the day. At this time Grant's line in front of the landing was held by the broken organization of Hurlbut, W. H. L. Wallace, McClernand and Sherman. There were portions of various organizations available within the protected area, and Lew Wallace arrived during the night with 5,000 men. Buell himself had arrived at 1 P. M., and spent the afternoon in learning conditions and studying the ground, and the night in posting his troops. Nelson's division was ferried over at night, and advanced on the left; Crittenden's, as the steamers brought it from Savannah, was placed on Nelson's right. Two brigades of McCook's division, which followed Crittenden up the river, were established still further to the right. The Union gunboats *Tyler* and *Lexington* anchored off the ravine next above the landing, and near the close of the first day's fight, fired effectively upon the Confederate right flank and front, as the Union line was forced back toward the river. These boats continued their heavy shelling at intervals during the night, to the great discomfiture of the Confederate camps.

The battle of Monday, 7th, was opened under Buell's orders and direction. His left and centre advanced and became engaged with the enemy's pickets immediately after daylight, and encountered their main line at 6 A.M. McCook's two brigades moved at once into action, and were established still further to the right. The Army of the Ohio pressed steadily forward, and at 4 P.M. had possession of the camps of Stuart, Prentiss and a part of McClernand's. Two brigades of T. J. Wood's division arrived as the battle was ending, but only one reached the front. The action closed soon after 4, Buell's forces at that time covering two miles of the battle line (nearly three quarters of it, extending as it did to the left of Lew Wallace's division), and becoming hotly engaged there, in co-operation with Wallace's left regiment. Wallace, at the close of the battle, held the front of the Army of the Tennessee, McClernand, Sherman and Hurlbut being warmly engaged at the close in connection with the left of Wallace, and the right of McCook. About 5 P.M. the Army of the Tennessee reoccupied its former camps.

When Buell first advanced he was joined by Col. J. M. Tuttle of W. H. L. Wallace's second division, who gathered up about 1,000 men of his own command, rallied many more from fragments about his bivouac, and without orders proceeded to Buell's lines, reported to him, and fought with him through the day. At daylight Grant gave Sherman orders to advance on the right. He thereupon sent his staff officers to collect his men and moved forward about 7 A.M. At 9 o'clock Hurlbut moved under Grant's orders to support McClernand, who with Sherman, was then engaged near his former camp. Lew Wallace had advanced earlier and held the right of Grant's army. This division finally swung around upon the ground originally occupied by Sherman's camps, there coming in contact with the right of McCook of Buell's line. Here the battle ended.

The division commanders of Grant's army were J. A. McClernand, W. H. L. Wallace, Lew Wallace, S. A. Hurlbut, W. T. Sherman, and B. M. Prentiss. Buell's divisions on the field were A. McD. McCook, William Nelson, Thomas L. Crittenden and T. J. Wood. The division commanders of Johnston's army were: of Polk's corps, C. Clark and B. F. Cheatham; of Bragg's corps, D. Ruggles and J. M. Withers; of Hardee's corps, T. C. Hindman, P. R. Cleburne and S. A. M. Wood; reserve corps, J. C. Breckinridge. The best estimates of strength give Grant 33,000 at the opening of the battle, and Lew Wallace's reinforcement for the second day 5,000. The official reports give Johnston's strength at 39,000 to 40,000. The losses of Grant's army were 1,513 killed, 6,601 wounded and 2,830 missing; total, 10,944. Buell lost 241 killed, 1,807 wounded and 55 missing; total, 2,103. Total Union loss, 13,047. The Confederate loss was 1,723 killed, 8,012 wounded and 959 missing; total, 10,694. Consult 'Official Records' (Vol. X, LII, Part I); Grant, 'Personal Memoirs' (Vol. I); Sherman, 'Memoirs' (Vol. I); Van Horne, 'History of the Army of the Cumberland' (Vol. I); Shiloh Battlefield Commission: 'The 77th Pennsylvania at Shiloh' (Hist. of the Reg. by J. Obreiter) and 'The Battle of Shiloh' (D. W. Reed, Harrisburg 1905); Rich, J. W., 'The Battle of Shiloh' (Iowa City 1911). See also *Bibliography* under CIVIL WAR IN AMERICA.

H. V. BOYNTON,
Late General, U. S. Army.

SHIMODA, shē'mō-dä, or **SIMODA,** Japan, a seaport town on the island of Hondo, at the western entrance of the Gulf of Yeddo, 80 miles southwest of Tokio. It was nearly destroyed by an earthquake and tidal wave in 1854, but was rebuilt, and since 1857, when the Dutch treaty was signed, it has been a free port for foreign commerce. A daily steamer service runs between this port and Tokio in summer. Pop. 5,000.

SHIMONOSEKI, and **MOJI,** shē-mo-no-sĕk'ē, mō'jē, the former originally called Akamagaseki, now popularly known as Bakan: a fortified town, seaport and railway terminus of Japan, at the southwestern extremity of Honshu (the Main Island), situated in 130° 56′ E. long., 33° 57′ 30″ N. lat. on the northern coast of the Shimonoseki Straits. Together with Moji, on the opposite coast, the town holds the key of the western gateway of the Inland Sea The town extends four miles from east to west and has extensive docks where much Japanese and foreign shipping is cleared, though its trade is not so large as that of Moji. Shimonoseki is famous in Japanese history for the sea-fight in 1185, by which the Taira Clan was exterminated by the Minamoto Clan. Here also took place a bombardment of the forts, 5–8 Sept. 1864, by a united squadron of American, British, French and Dutch warships, which landed marines and seized the batteries The situation arose through the action of the Daimyo of Chōshū (in whose territory the town lay), in attempting to keep foreigners away by repeatedly firing on foreign ships that passed his batteries on the coast. The American steamer *Pembroke* was fired upon 25 June 1863; on 16 July United States steamship *Wyoming* destroyed two vessels and attacked the batteries in retaliation. When the combined squadrons (17 vessels) of the four powers brought the Daimyo to terms, the latter agreed to abstain from future hostilities, and thenceforth to supply foreigners with provisions. The Shogun (Commander-in-chief, a feudal office abolished in 1868) was obliged to pay an indemnity of $3,000,000, of which amount the United States received $785,000. The American government returned this sum to Japan in 1883, but without interest. After the Restoration in 1868 Shimonoseki rose in prosperity owing to its geographical situation. The treaty of peace which ended the Chino-Japanese War of 1894 was signed

here 17 April 1895 (ratified 8 May) by Marquis Ito, Japanese premier, and Li Hung Chang for China. Pop. 58,300.

Moji is usually coupled with Shimonoseki as their interests in shipping are indentical. The latter is under the jurisdiction of Yamaguchi, 51 miles away; Moji under that of Fukuoka, 47 miles away. The foreign merchants and shipping agents have their offices on the side best suited to their convenience, but the principal Japanese banks and shipping offices are at Moji. That town became important in 1887 when the Kyúshú Railway made it the terminal. It is entirely open to general foreign trade. Pop. about 56,000.

SHIN-PLASTER, a bank-note, especially one of a low denomination; a piece of paper money. The term is derived from an old soldier having used a quantity of worthless paper currency as plasters for a wounded leg. See MONEY, PAPER.

SHINER, one of various small silvery fishes of the family *Cyprinidæ*, found in all streams from New England to Kansas and Louisiana, especially in those choked with weeds. They are the object of childish angling expeditions, and sometimes are large enough to be cooked, but should be eaten at once, as the flesh spoils quickly. (See DACE; MINNOW). The moonfish (*Vomer setipennis*) is sometimes called blunt-nosed shiner.

SHINGLE. A shingle is a flat, tapered piece of wood used as a roof covering or for the siding of houses and bungalows. Dating back to the earliest American settlements, the wooden shingle has been used as a roof covering, and only in comparatively recent years has any other roofing material been used by the people of the United States and Canada. Until the latter part of the 19th century the shingles were cut from the nearest woods at hand that best answered the purpose. The earliest settlers on the Atlantic Coast used principally the wood of the White Pine and the Virginia Cedar. As they were made by hand, such woods were selected as possessed a straight grain, split easily and possessed a considerable degree of durability. In the southern part of United States, Cypress is largely used for shingles.

The rapid development of the United States, however, called for large quantities of wood for other construction purposes, and gradually the supply of woods suitable for the manufacture of shingles became exhausted to such a point that woods of more abundant supply were sought. On the Northwest Pacific Coast was found the Western Red Cedar in practically inexhaustible supply, and it was discovered that this species had been used on the Pacific Coast for shingles since the time of the earliest settlements there.

Development of transcontinental railroads made available shingles sawn from this species over almost the whole of North America and to-day 85 per cent of the shingles manufactured are sawn from this wood. Due to its large use in the manufacture of shingles, Western Red Cedar (*Thuja plicata*) is also commercially known as "shingle wood."

At the present time, California Redwood, Southern Cypress, Eastern White Cedar and the Western Red Cedar constitute about 99 per cent of the supply for wooden shingles, but the latter is by far the best known, and most widely used.

On the warm moist slope of the Cascade Mountain Range in Washington, Oregon and the Province of British Columbia, the Western Red Cedar tree is found in great abundance, and in this locality it attains its maximum growth and size. Trees of from 12 to 16 feet in diameter, measured 4½ feet from the ground, are not uncommon. Under average growing conditions, when this tree is mature it will have a clear bole of from 50 to 100 feet. No other American wood is better adapted to the requirements of a wooden shingle than Western Red Cedar. The supply is sufficient to meet all demand. It is durable in the extreme. It is quite easily worked. It has an extremely straight-grain. It is light in weight. It has an oil peculiar to this wood alone that renders it quite immune from the ravages of fungi and insects.

The timber is removed from the woods in either log or "bolt" form. At the shingle mill the timber is cut into the length of shingle desired and is then usually barked and cut into blocks small enough to be handled with ease. The resulting blocks are then placed in a shingle machine, which automatically cuts off the tapered shingles. Any defects are then trimmed off and the shingles cut into the most desirable widths. The shingles are then dropped into large bins, from which they are packed. To expedite seasoning and to reduce the weight for transportation purposes, after packing the shingles are put through a dry kiln, where they are dried for from 7 to 10 days, at the end of which time they are ready for shipment.

Cedar shingles are cut in two standard lengths, 16 and 18 inches. Each lengthed shingle is packed in two standard thicknesses. For the 16-inch shingles, these thicknesses are five-to-two and six-to-two, meaning five shingles at their butts will measure two inches, and six shingles at their butts will measure two inches, respectively. For the 18-inch shingles, these thicknesses are five-to-two-and-one-quarter and five to two. The most common grades for the 16-inch shingles are "Extra Clear" and "Extra Star-A-Star"; for the 18-inch shingles "Perfections" and "Eurekas."

There are many striking examples of long life peculiar to the roofs of homes covered with Red Cedar shingles. "Lowland," the magnificent mansion of the late George Abbot James, at Nahant, Mass., was built and roofed with Red Cedar shingles in 1872 and is found to be in perfect state of preservation. The old Block House built at Fort Borst in 1845 was roofed with Red Cedar "shakes" (split shingles) and is still in an excellent state of preservation. Many of the pioneer homes of the Northwest that were covered with Red Cedar shingles are yet in service.

Logs of Western Red Cedar have been frequently found in the forests of the Pacific Northwest, over which trees have grown, that have been found by counting their annual growth rings to be over 800 years old. In every instance the logs have been found to be in a perfect state of preservation.

Due to the abundance of timber supply, and the comparatively small amount of capital necessary to finance the manufacture of shingles, there have been a very large number of shingle mills constructed. It has been estimated that in excess of 400 shingle mills were in operation in 1908. This has constituted an over capacity, which has been a very material factor in causing a depressed condition in the shingle industry, but a gradual evolution of the timber into fewer hands, the construction of fewer mills, but of larger capacity, is resulting in a stabilization of the shingle industry and the placing of this industry upon a sound economic basis, and the making possible of guaranteed quality.

SHINGLES, an acute disease (*herpes zoster*) characterized by an eruption of vesicles on an inflamed surface of skin. The name is derivatively related to *cingle,* a belt or girdle. Shingles occurs most frequently in children and young adults between the ages of 4 and 20. In children it is more liable to appear during or after other diseases, such as whooping-cough and diarrhœa. In adults various debilitating causes seem to predispose to its attack, especially paralysis of the insane, cerebro-spinal meningitis and the arsenic habit. The actual causation of the disease is unknown. The eruption consists of red spots and small vesicles which are mostly disposed round one side of the body, like a half belt. In rare cases it encircles the body. It has an obscurely nervous character, occurs in the course of a nerve, and is preceded by stinging neuralgic pains, also by languor, lassitude, loss of appetite, shiverings, headache, nausea, quickened pulse, etc., after which the eruption appears in irregular patches. The vesicles become enlarged to the size of small pearls in 24 to 36 hours, and fresh clusters occur for three or four days, completing the belt-like appearance. As the eruption recedes by the fifth or sixth day, the vesicles become white and opaque, and the red margins become livid or purple. Sometimes the vesicles burst, and several of the patches run together, forming irritable sores, discharging a thin serous fluid, which concretes and forms a crust, that falls off as the parts beneath heal. The disease is not contagious. It may be produced by sudden exposure to cold after violent exercise, and sometimes follows acute affections of the respiratory organs. A similar eruption may appear on the lips and chin in a common cold. No known remedy given internally has a specific beneficial effect in shingles. The treatment consists in gentle laxatives, and in rectifying any derangement of the system; but the disease must be allowed to run its course, although the irritation can be diminished by local application. In the severer forms sulphur ointment is recommended.

SHINN, Everett, American artist: b. Woodstown, N. J., 6 Nov. 1873. He studied at the Philadelphia Academy of Fine Arts and in Paris. He is known for his pastels and mural decorations, and as a magazine illustrator. He painted the mural decorations at the Belasco and Stuyvesant theatres, New York, and at Trenton City Hall.

SHINN, Florence Scovel, American illustrator, wife of E. Shinn (q.v.), to whom she was married in 1898: b. Camden, N. J., late 19th century. She studied at the Pennsylvania Academy of Fine Arts, and became well known for her book illustrations, which include 'Mrs. Wiggs of the Cabbage Patch,' 'Lovey Mary,' and 'Coniston.'

SHINNECOCK, shĭn'ĕ-kŏk, a bay on the south shore of Long Island (q.v.). It indents Suffolk county for about 12 miles, and at the entrance is a long, narrow sand-bar. Nearby is the land owned by the Shinnecock Indians.

SHINNECOCK INDIANS, an Algonquian tribe of Long Island, N. Y., formerly occupying the southern coast from Shinnecock Bay to Montauk peninsula. Many of them early joined the Brotherton Indians, and the 143 that remain (1919) on their reservation of about 400 acres, three miles west of Southampton, have intermarried with negroes until their aboriginal character has been almost obliterated. (See INDIANS, AMERICAN). Consult Hodge, F. W. (ed.), 'Handbook of American Indians' (2 vols., Government Printing Office, Washington 1907–10).

SHINTO (spirit-way), the primitive folk-faith of the Japanese, was a typical barbarian religion composed of nature-worship and ancestor- (including hero) worship. Chinese culture, filtering into Japan through Korea, brought with it Confucianism about the 4th century A.D., and Buddhism in the 6th; and these two made with Shinto a religious compound in Japan similar to that which they made with Taoism (see TAOISM) in China, except that Shinto was nearly absorbed by Buddhism, until its resuscitation, from the 18th century onwards. This culminated in its reinstatement in pure form as state religion at the Japanese revolution in 1868, only, however, some years later to be disestablished and declared not a religion, but a state ceremony. Under the influence of modern education, its cult is rapidly declining. This immigrant Chinese culture also made possible commitment to writing of the Shinto myths and legends, 712 A.D., into the Kojiki, "Ancient Records," and of the Shinto rituals, 927 A.D., into the Yengishiki, "Ceremonial Law"; recording their barbarian traits in a naive, unexpurgated form which aptly exemplifies the rise of religion in both creed and cult.

The Japanese theory of origins begins its myths with Izanagi, "Male who Invites," and Izanani," "Female who Invites," a primitive pair that still survive in popular belief. Their begetting of the various islands of Japan — which, as the commentators of old Japan used to explain, have since grown enormously — was performed with the aid of phallic rites (see PHALLICISM) which persisted in Japan until the revolution in 1868. After the decease of his sister-wife, Izanagi produced several deities in various magical ways, and especially three great deities: Amaterasu (Sun) from his left eye, Tsuki-Yomi (Moon) from his right eye, and Susano (Storm-cloud) from his nose, with obvious implication of Izanagi as creative Heaven. Amaterasu-O-Mi-Kami, "Heaven Shines Great August Deity," has always stood supreme, as sun goddess, among the myriad deities of Shinto, and is still worshipped at innumerable shrines throughout Japan. Susano, "Impetuous Male," represents the storm-cloud, now in turbulent strife with his gentle sister, Amaterasu, now quelling destructive fires for man. His rule over Izumo province descends

through six generations to O-Kuni-Nushi, a moon-god who with his son, Koto-Shiro-Nushi, are now popular as gods of wealth, under the names of Daikoku and Ebisu. The former is seated on rice bales, the latter holds a fish, these being the staple foods in Japan.

In accordance with the evolution of religion, the Kojiki now passes from the origin of its gods in myth to the origin of its rulers and priests in legend, and of course secures authority for the latter by derivation of them from the former. Thus the Kojiki relates how Amaterasu produced by magic a son, Ho-Mimi, whose begotten son, Ninigi, at her command, descended from Heaven with a retinue of nobles and priests, deposed O-Kuni-Nushi, and founded that Imperial Dynasty which still after two millennia rules in Japan, "in lineal succession unbroken for ages eternal." The Imperial Oath, prefaced to the Constitution of Japan, promulgated in 1890, appeals to the "Imperial Founder of our House," namely, Jimmu Tenno, greatgrandson of Ninigi, who was in turn supposititious "sovereign grandchild" of Amaterasu-O-Mi-Kami. The "Heaven" from which Ninigi, with his nobles and priests, really descended was Korea, as the Kojiki naively implies and as certain monuments show.

After his abdication and death, O-Kuni-Nushi became (according to his Kyushu conqueror) as "Great Deity of Miwa," ruler of the "invisible," by which was meant the world of thought and secret action which escapes the notice of the earthly ruler. The tutelary gods of every province must report at O-Kuni-Nushi's shrine in Izumo every October (hence called everywhere except in Izumo the "godless month") upon the condition of each individual's soul. O-Kuni-Nushi then punishes or rewards by means of the natural good and evil that befall men. Later he became a ruler of the dead. The mythical element in the Kojiki now decreases and legend passes into annals which close in the 5th century A.D.

The ancestor and hero worship of Shinto was absorbed by Buddhism, since the latter professed especial knowledge about the future life; though each district managed to retain an Ujigami, Clan god, to whom infants were presented for adoption and naming. Hero worship is maintained mostly in these Ryobu, "Two Faced," shrines. Such were Tenjin-Sama, "Heaven Spirit Lord," originally the minister of state and scholar, Michizane of the 10th century A.D.; Hachiman San, an apotheosis of the Emperor Ojin of the 4th century A.D., as God of War; Ieyasu and Iyemitsu, 17th century shoguns of Japan, with gorgeous temples at Nikko; and Motoori, a patriotic scholar apotheosized during the last reign. Until the revolution in 1868 two *living* persons were regularly treated as divine; the Mikado still styled Tenshi Sama, "Heaven Son Lord," descendant of Amaterasu-O-Mi-Kami; and the highpriest of the Izumo O Yashiro, being the 76th generation from O-Kuni-Nushi, and until 1868 styled Iki-gami, "Living-god."

The Yengishiki, "Ceremonial Law," compiled 927 A.D., from much older sources, is a worthy companion to the Kojiki. It contains 27 rituals, which consist, not of free petitions, but of statements of the *grounds* upon which the offerings, which are the essential thing, are made, namely the reception of some natural good. The famous Obarsi, performed for the whole nation 30 June and 31 December, affords a single exception to this quest for natural good. The Kagura is a popular occasional ceremony, a peace offering of food, music and dancing made to any deity by the temple attendants — usually the daughters of the resident priest — at the request and expense of any worshipper. The priests marry, their office is hereditary, but may at any time be abandoned, and distinctive dress is worn only when they are officiating. They make no claims to personal sanctity or authority.

The infrequent preaching of the priests always appeals to the examples of the gods, and for positive rules to the laws of that Tenshi Sama who rules by divine right. As for the rest of conduct, "Human beings, having been produced by the spirit of the two Creative Deities, are naturally endowed with knowledge of what they ought to do and what they ought to refrain from. It is unnecessary for them to trouble their heads with systems of morality."— N. Matoori. The Kurozumi, a sect founded a century ago, and now having about a million adherents, practises mental healing by various rites, and by accord with two commandments: Thou shalt not be without a constantly believing heart. Thou shalt not yield to anger nor grief.

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EDMUND BUCKLEY.

SHIP. A ship is a large boat, or vessel, intended for navigating the ocean. Technically a ship is a vessel carrying not fewer than three masts rigged with square sails. In the present day ships are of two kinds, sail and steam. For a history of the former see the article SAILING VESSELS, and for a historical sketch of steamships, see the article STEAM VESSELS. A detailed description of vessels used in naval warfare will be found under the title WARSHIPS.

A ship has three principal dimensions: length, beam and depth. Length is the straight-line horizontal distance from bow to stern. It is officially measured on the upper side of the upper deck of vessels having less than three decks, and on the second deck above the keel on all other ships; the beginning point being the inside of the inner plank at the side of the stem and reaching to the inside of the planking at the midship stern timber; deducting the amount of rake of the stern timber in the thickness of the deck, and one-third of the fore-and-aft round into the beam. The "beam" is the horizontal distance amidships taken at right angles to the length. Officially it is measured from inside to inside of the planking on the under side of the measurement deck. The depth is the vertical distance from the under side of the beams of the deck of measurement to the keelson. That part of the depth of a ship below the water-level is called the draught; that part above the water-level is termed the freeboard. The draught and freeboard vary according to the weight of cargo

carried, the draught being more and the freeboard less when the weight is greater.

The principal requirements of a ship are buoyancy, stability, strength, capacity and speed. The buoyancy of a vessel depends upon its ability to displace a greater weight of water than the weight of the materials of which it is built. The weight of water (in tons) thus displaced is called the displacement of the ship; and as salt water is heavier bulk for bulk than fresh water, with the same load a ship will ride higher in salt water than in fresh. The centre of buoyancy is equivalent to the centre of gravity of the mass of water displaced by the ship. When the ship is at rest in placid water it is located at a point in the vertical line passing through the centre of gravity of the ship. It is the point at which the pressure of the water in which the ship floats is theoretically centred — as the *force* of buoyancy. This force, however, acts not at the centre of buoyancy, but vertically upward through that centre. As the ship rolls under the action of waves or of wind the centre of buoyancy shifts. In Fig. 1, the continuous lines show a sectional diagram

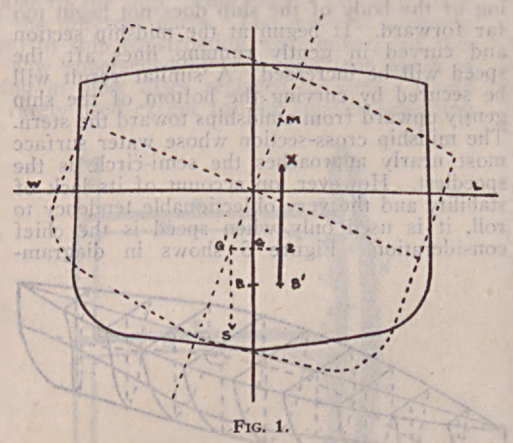


FIG. 1.

(amidships) of the vessel at rest in placid water: the dotted lines show the vessel heeled over by wind and wave. The centre of buoyancy has swung from B to B'; the centre of gravity moves to G'. XB' shows the position of the force of buoyancy, and G'Z the force moving to right the ship to an even keel. Stability is that quality of a ship by virtue of which it resists overturning. The nearer the centre of gravity of the ship can be brought down (in the loading) to the centre of buoyancy, the more stable the ship — that is, the greater the force which must be applied to raise the centre of buoyancy above the centre of gravity and cause an overthrow. In other words the stability of a ship depends upon the relative positions of the centre of gravity and the centre of buoyancy. The centre of gravity is discovered by a calculation of the various weights making up the ship's total displacement. A similar series of calculations based on the form, or proposed form of the ship will determine the position of the centre of buoyancy. A graphic method of arriving at the same result consists of cutting from cardboard a series of cross-sections of the ship drawn to scale and gluing them together with their centre lines and load-water lines matching as in Fig. 2. Several groups of these cross-sections are made, one for each angle of rolling. Equidistant parallel lines are drawn across each model, representing the position of the vessel with different loadings. The divisions are cut

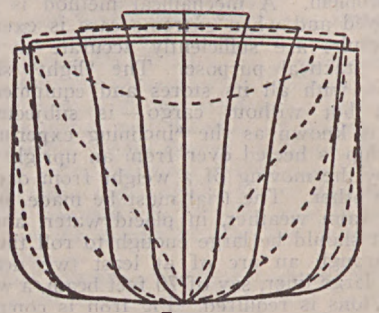


FIG. 2.

off in succession from the top line, and the remainder after each cutting is carefully weighed and recorded for purposes of comparison. Before each cutting the combination of cross-sections is suspended from a nail, allowing it to hang freely, and a plumb-line hung from the same point of support. The model is hung first from one corner and then from the other — as shown in Fig. 3, where PL represents the plumb-line in the first suspension, and its trace in the second suspension, QR the position of the plumb-line in the second suspension, and B the centre of buoyancy found by their intersection. From B a line is projected vertically upward — that is at right angles to the water-line to which the ship is assumed to roll. The extension of that line until it meets the centre line GK of the ship's molded form gives the point M, known as the metacentre. In discussing the principles of flotation, the ship is often considered a pendulum whose point of suspension is at the metacentre. The higher this point is above the centre of gravity (G), the more stable the ship. As M is made by the molding or the loading to approach G, stability diminishes, and when M passes below G the equilibrium is unstable, and overturning is imminent. The horizontal distance (GZ) from

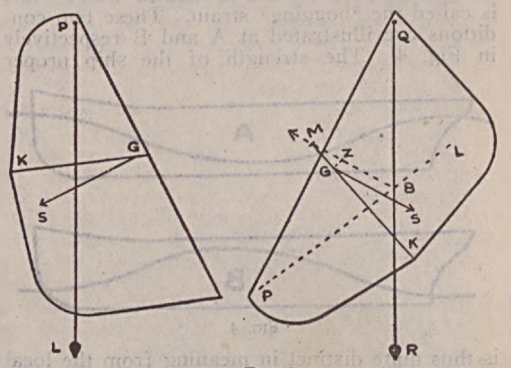


FIG. 3.

the centre of gravity to the vertical line passing through the centre of buoyancy and the metacentre represents the force operating to right the vessel; that is, when the lines of the model are drawn to a standard scale.

Finding the centre of gravity is a much more complicated process. The necessary calculations are too extended to be reproduced here and the reader is referred to technical works on shipbuilding for intensive study of the problem. A mechanical method is often employed and when extreme care is exercised the results are sufficiently accurate to serve every practical purpose. The "light" ship — that is, with all its stores and equipment on board, but without cargo — is subjected to what is known as the "inclining experiment." The ship is heeled over from an upright position by the moving of a weight from one side to the other. The trial must be made in perfectly calm weather, in placid water, and the weight should be large enough to roll the vessel through an arc of at least two degrees. For a large liner, say of 70 feet beam, a weight of 10 tons is required. Pig iron is commonly used. A long plumb-line is suspended inside of the ship and its deflections marked. The metacentre having been previously determined by the finding of the centre of buoyancy, the remainder is easy.

Trim, as applied to a ship, is allied to its stability. The term signifies the condition of draught as related to its length. For example, if the draught forward is one foot less than the draught aft, the vessel is said to have a trim of one foot by the stern. A trim by the head would mean that the draught forward was the deeper.

Strength of structure is necessary to withstand the strains to which the ship is subjected by wind and waves. In order to calculate these strains the vessel is regarded as a girder supporting the various weights of cargo, engines, coal, etc., acting downward; and also acted upon by the lifting strain of buoyancy acting upward. This girder is studied in two situations: First, as lying across the trough between two waves, supported at each end by deep water with its large lifting strain and by shallow water with very little supporting power at the middle: this is called the "sagging" strain. The other critical position is that where the middle of the ship's length is supported by the deep water of the crest of a wave and both ends are in shallow water: this is called the "hogging" strain. These two conditions are illustrated at A and B respectively in Fig. 4. The strength of the ship proper

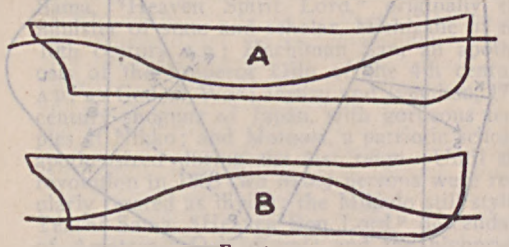


FIG. 4.

is thus quite distinct in meaning from the local strength of various parts designed for certain purposes, as for the distribution of the weight of the engines, the thrust of the propeller, the supports for hoisting cranes, and the like.

The capacity of a ship is her power of carrying stores and cargo, together with crew and passengers. The greater this capacity is in proportion to the size, and the greater the speed of the vessel, the greater is her utility. The more lightly a vessel is built the greater will be her capacity for her size; but the lightness of a vessel is limited by the need of strength to resist strain. Capacity is also to some extent dependent on form, and the form which is most conducive to high speed is not necessarily that which gives the greatest capacity for stowage. The speed of a vessel, as also facility of evolution or promptitude in obeying her helm, depends on the due proportion of her parts. Given an equal engine power, the speed of a vessel is dependent upon its underwater outlines. In a general way it may be said that the sharper the bows the more easily the resistance of the water is overcome; and long, gentle, horizontal curves are speedier than a straight, chisel-shaped form. Bevelling-up the bows from the keel to the deck tends to an increase of speed in two ways: it lowers the initial resistance of the water and causes a tendency of the bow to rise and ride upon the water, thereby diminishing the draught. Bevelling-up the stern is also of advantage, provided the tapering of the body of the ship does not begin too far forward. If begun at the midship section and curved in gently running lines aft, the speed will be increased. A similar result will be secured by curving the bottom of the ship gently upward from amidships toward the stern. The midship cross-section whose water surface most nearly approaches the semi-circle is the speediest. However, on account of its lack of stability and the very objectionable tendency to roll, it is used only when speed is the chief consideration. Figure 5 shows in diagram-

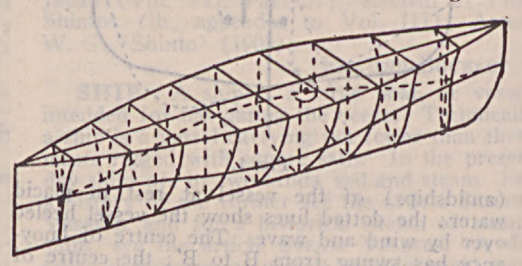


FIG. 5.

matic form the shape and water-line found to be speediest under any given propulsion, the length being from 7 to 10 times the beam. It is common in swift river steamers, but is not used for cargo vessels, as it lacks in profitable carrying capacity. The midship section of the cargo ship is on the lines shown in Fig. 1.

Construction.— In designing a ship the midship area is computed and a midship section made from which the proportions of the other parts of the ship are calculated. The whole plan of the ship is then drawn in three related sectional plans, called the sheer-plan, the body-plan and the half-breadth plan. The sheer-plan is a projection on a vertical longitudinal plane dividing the ship on its centre line into two parts and gives a complete view of the side, representing the length, depth, rake of the stem and stern, with the wales, water-lines, decks, ports, masts and channels. The body-plan is a projection of the largest vertical and athwartship section, showing the breadth and having described upon it every timber composing the

frame of the ship, those running forward from the place of greatest breadth being described on the right hand, those running aft on the left of the centre line. The half-breadth plan shows the half-ship lengthwise as seen from above. The water-lines are drawn on the sheer-plan as parallel straight lines; they are dotted in or drawn in blue ink on the half-breadth plan, and show the width and horizontal curves of the hull at different levels corresponding with the water-lines in the sheer-plan. Half-models of the vessel are also made. These are constructed of thin strips of wood laid horizontally on each other, which represent the parallel water-lines, and can be taken apart to serve as models for the full-sized drawing. When the plans are complete full-sized drawings are traced in chalk on the floor of a room called the mold-loft, which is usually of a length equal to half that of the largest ship, in addition to the whole height of her hull. This operation is called laying off the ship. It supplies the workmen with the exact shape and position of that which constitutes what is called the frame of the ship. Pine models are then made of the different parts. The material formerly used in ship construction was timber, but this is now superseded by iron, and iron again is being in most cases replaced by steel. Wood is rarely used except for the smaller sea-going

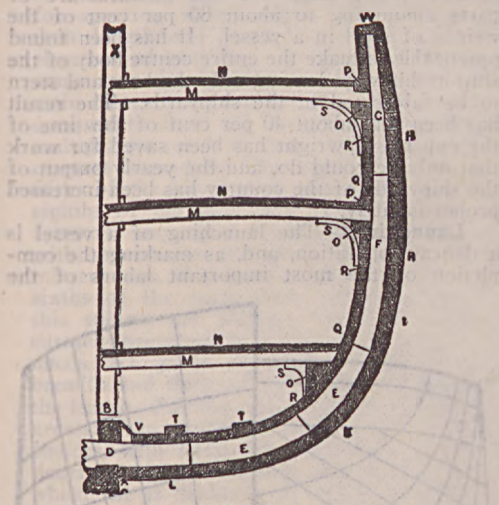


FIG. 6.

Midship section of wooden vessel: A, keel; B, keelson; C, false keel; D, floor; EE, futtocks; F, top-timber; G, lengthening piece; HH, wales; I, diminishing planks; K, bottom planks; L, garboard strakes; M, beam; N, deck; O, shelf; P, waterway; Q, spirketting; R, clamps; S, knees; T, side keelsons; V, limber strakes; W, rough-tree rail; X, mast.

vessels, coasting craft and small yachts and boats. In the haste to replace the shipping lost by the German submarine warfare the building of wooden ships was extensively revived. The materials commonly used for wooden vessels are oak, teak, cedar, pine, beech, elm and many others, some being more suitable for one purpose, and some for another. In forming the separate pieces of the frame, which is technically called the conversion of the timber, the principal points to be studied are the use of the proper wood to give the requisite strength, rigidity, elasticity or toughness to each part; the selection of pieces from which the most important parts can be cut in the most perfect manner, and all the frame made as strong and free from faults as possible; and lastly, the economical use of timber. The last object is often found to be practically antagonistic to the others, for though a small gain which sacrifices the efficiency of a costly machine can never be dreamed of as economy, it is not always easy to hit the exact mean between waste of material and sacrifice of efficiency; and when a low prime cost is an object, false economy is often practised deliberately. It is one of the advantages of the use of iron that the cost of material can be more exactly proportioned to the degree of efficiency it is designed to secure.

Keel and Frame.— The keel is usually made of elm, which is tough and not easily injured by water and is very suitable for receiving the numerous fastenings necessary to fit the other parts into it. In large vessels the keel is usually made of several pieces of timber scarfed together. The keel is not perfectly horizontal, but deeper at the stern than the bow, which gives the ship greater steadiness and freedom of motion. Below the keel is placed the false keel, of elm four to five inches thick, which protects the true keel from abrasion and gives greater steadiness to the ship. At both ends of the keel is placed the deadwood, which, cut into a curvilinear form at its upper surface, forms the line of the bottom of the ship's body. The stem and stern posts are set up at each extremity. The stem post is curved at its lower extremity. In a large ship it is divided into three pieces, called upper, lower and middle. The scarf which unites the stem post with the keel is called the boxing. The stern post is, if possible, made of one piece of oak, so as to have greater strength to support the rudder. It is inserted into the keel by tenons and mortices. The frame of the ship consists of floors, cross-pieces, futtocks and top timbers. The floor timbers are placed across the keel perpendicularly to its length, the upper surface of the keel and deadwood being cut to receive them. They are fastened in various manners. The timbers which join the floor are called the first futtocks. Other floors and futtocks are placed upon the first to complete the frame. The timbers of the frame below the surface of the water are curvilinear, above it nearly rectilinear. The distance between the frames is called room and space. Upon this the relative weight and strength of the ship greatly depend. The stemson is worked in as a support to the stem; the keelson, placed above the keels, serves to secure the floor timber and is scarfed to the stemson and sternson, which latter is bolted to the stern post. The beams which support the decks are received on longitudinal ribs called shelves, which form part of the frame, and above which are the waterways. The frame being completed, the skin or planking is applied, the vessel being first set upright and plumbed to ascertain that her frame is duly proportioned. The outer planking of a large vessel of oak is three to six inches thick. It is fastened to the ribs by bolts and trenails or by plugs of oak tightened by wedges. The decks of a ship are not completely flat, but are set to the segment of a large circle, which enables them to throw off the water. The holes

for carrying away the water are called scuppers. The seams of the outer planking of a wooden vessel are made watertight by caulking. This is forcing oakum (see OAKUM), by means of sharp iron wedges called caulking irons, into the seams of the planking, which are forced

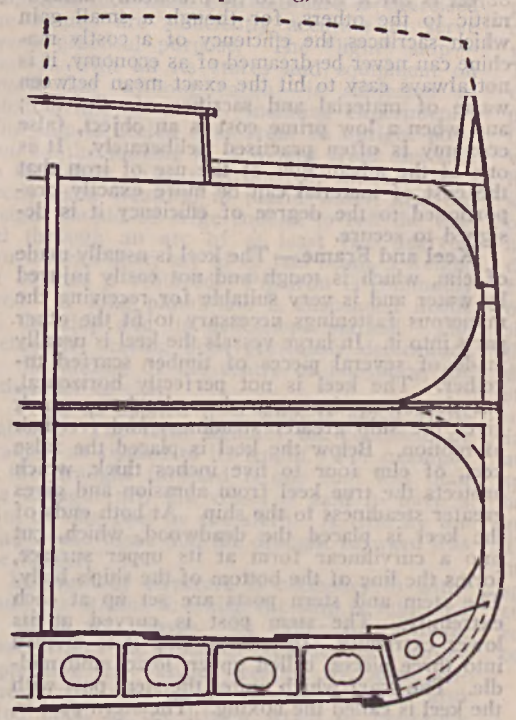


FIG. 7.

open by reaming irons. The seams are then payed with melted pitch. The decks are also caulked with oakum.

Iron and Steel.— For shipbuilding purposes iron and steel have been found by experience to be greatly superior to wood. An iron vessel is lighter than a wooden one of the same size, and with iron an equal strength may be obtained with less weight. Iron is also far more manageable than wood, as it can be bent with ease into any required shape. Steel is a still lighter material than iron. The same names for the different parts are generally retained in building with iron or steel, though they have little correspondence with the parts of a wooden vessel except in position. A diagram of half the midship section of a modern steel vessel is shown in Fig. 7. The keel is of far less importance than in wooden ships, and does not as in them hold the position of foundation or "backbone" to the whole structure, since an iron vessel is designed to be mutually supporting throughout. An iron ship, in fact, resembles a tubular iron bridge, closed at both ends, and the deck is of as much importance as the bottom to the strength of the whole. The keel is constructed of plates riveted together, and sometimes is made hollow. From it, and riveted to it on either side, rise the ribs, which are girders built up of plates, and to the ribs on the outside is fastened the plating. The plating consists of sheets of metal one inch or more in thickness, overlapping each other at the edges, where they are riveted together at intervals of three and one-fourth to four inches. The plates vary in thickness according to position and strength required. Figure 8 shows the lines of plating as laid out on a body plan. There may be an inner skin of plating as well as an outer, and this of course adds to the strength and safety of the vessel. The ribs are tied together and at the same time held rigidly in place by means of iron, which support the deck or decks. The decks consist of wooden planking with thin metal plates below. In the finer class of ships there are water-tight partitions or bulk-heads of iron stretching across the vessel from side to side and from keel to deck, with water-tight doors in them, so that if in case of an accident the water gets into one of them the rest may keep the ship afloat.

Fabricated Ships.— The term "fabricated ship" signifies a type of steel vessel on which the punching and shaping of plates and "shapes" and a part of the assembling and rivetting is done in a shop ordinarily employed in structural iron work; as, for instance, bridge building, or steel frames for skyscrapers. This plan, a strictly American idea put into operation during the Great War, and adopted at once by most of the shipbuilding nations, has the great advantage of utilizing the expert knowledge of steels and the superior special equipment of the steel worker's shop for the manufacture of parts amounting to about 80 per cent of the weight of steel in a vessel. It has been found practicable to make the entire centre body of the ship in this way, leaving only the bow and stern to be fabricated in the shipyards. The result has been that about 40 per cent of the time of the expert shipwright has been saved for work that only he could do, and the yearly output of the shipyards of the country has been increased proportionately.

Launching.— The launching of a vessel is a delicate operation, and, as marking the completion of the most important labors of the

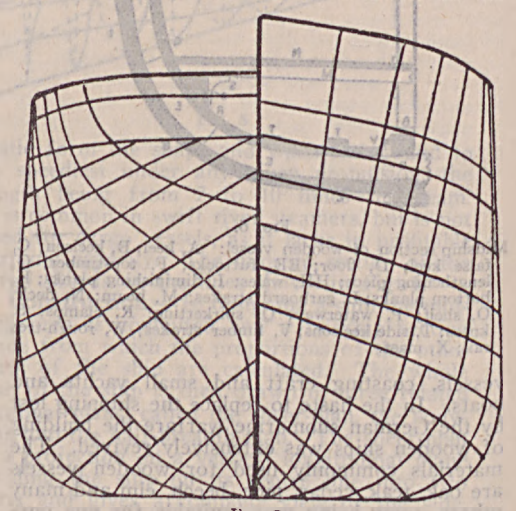


FIG. 8

shipbuilder, is usually made the occasion of a public exhibition and celebration. Two parallel inclined platforms of solid timber are laid one on each side of the keel, at the distance of a few feet from it and extending from the stem as far below the stern as can be reached at low water. In this position they are carefully and firmly blocked and supported throughout their length. This double platform is called the ways. Upon it a second system of timber is loosely laid, and well greased between. The space from these last to the ship's bottom is everywhere filled with wedges of soft wood fashioned to its curves. The whole is called the cradle. The extremities of the cradle at the bow and stern are bound tightly across the keel with chains or ropes, and it is further kept from spreading by stout moldings, which overlap the outer edges of the ways. When the rising tide has reached well up the ways the wedges are simultaneously driven on every side, and the ship is raised from the blocks on which she has hitherto rested, and made to repose entirely on the cradle. The shores are all removed except the two spurs or dog-shores near the stem and when the proper moment has arrived these are also knocked away by falling weights, the rope holding up which is cut when all is ready. The vessel, now abandoned to her weight and encouraged by the yielding of the grease, begins slowly sliding along the inclined plane; her motion becomes at each moment more and more rapid until finally the noble fabric has abandoned its union with the land and entered upon its destined element.

Masts and Spars.— There are various rules for sparring sailing ships, all founded upon their length and breadth, which are the main elements of stability. It may be sufficient to name one simple rule for the length of the main mast, this being the prime mover; deduct one-twelfth from the vessel's extreme breadth, multiply the result by two; this will give height of mast from deck. The topmast may be three-fifths of the lower mast, the main yard seven-eighths of the same, and so on upward. The foremast may equal seven-eighths of the main, with upper masts and yards in proportion. The mizzen mast, if stepped on the keelson, is five-sixths of the main mast. The best rules on this subject are perhaps found in tables accurately prepared, in which the lengths of the masts are given in fractions of the ship's breadth and those of the yards in fractions of the length. For the rest, it will be in most cases necessary to modify any given rule, in all instances, with immediate reference to the particular model of the ship and to the uses for which she is destined. It would be an advantageous improvement in merchant ships, not sparred to the extent of their capacity, to make the fore and main masts in all cases of equal dimensions. With improved appearance they would have all the respective spars and sails, except the courses, answering equally for both masts. This would enable them to go to sea with fewer spare ones, or to derive more advantage from the usual number. In small ships all the spars are of single sticks of pine timber, which, for equal contents, are always stronger; but for ships above 600 or 700 tons it is impossible to procure single trees sufficiently large and then it becomes necessary to resort to made masts (so-called), which are of oak and pine, very artificially put together and bound with stout hoops of iron. Hollow-iron masts are also frequently used.

Rigging.—Many large vessels are fitted with four masts, some with five. The standing and part of the running rigging are formed of wire rope. The masts and bowsprit of a ship are not abandoned to their own unsupported strength, but require to be sustained by the standing rigging. This consists, for the bowsprit, of gammoning and bob-stays, confining it down to the stem; and shrouds, which sustain the immense lateral pressure which it endures when on a wind. The jib-boom and flying jib-boom are in like manner supported by means of martingales and guys. The foremast is supported by three or four pairs of shrouds on either side and by two stays led forward to the bowsprit. The foretop mast is supported by shrouds setting up in the top, back-stays descending to the channels (broad pieces of planks fixed edgewise to the outside of the vessel for spreading the lower rigging), and stays leading to the bowsprit end. The top-gallant and royal masts have also their shrouds setting up through the cross-trees, their backstays descending to the channels and their stays leading to the jib and flying jib-booms. In like manner are the main and mizzen masts supported, except that the main-stays set up on deck beside the heel of the bowsprit, the main-top-mast-stays at the head of the foremast, the main-top-gallant-stay to the fore-top-mast-head and main-royal-stay to the fore-top-gallant-mast-head. The mizzen-stay also sets up beside the mainmast and the same in ascending. The running rigging consists of the tacks and sheets that serve to spread the sails, the halyards, traces, lifts, clewlines and all other ropes used in making, taking in or manœuvring the sails.

Sails.— The sails of a ship are square sails bent to the yards and fore-and-aft sails traversing on stays or bent to gaffs. Let us describe an entire suit, beginning forward. On the extremity of the bowsprit is the flying jib, a three-cornered sail, which goes from the end of its boom upward along its stay, leading to the fore-top-gallant-mast-head and confined to the stay by rings of wood or iron, called hanks. The jib, which leads from its boom to the fore-top-mast-head, is of similar form and so is the fore-top-mast-stay-sail, running from the bowsprit end toward the masthead. On the foremast we have the foresail, bent to the foreyard and spread at the foot by means of tacks and sheets; above it, the fore-top-sail, bent to the top-sail-yard, by means of which it is hoisted aloft, while its lower corners are spread to the extremities of the foreyard; next the top-gallant-sail, bent to its yard and sheeting home to the top-sail-yard, and so with the royal and sky sail. Double top-sails and top-gallant-sails are now much in use, that is to say, these sails are practically made each into two sails, which gives greater ease in handling. All these sails are turned at pleasure, to be presented to the wind, by means of braces attached to their yard-arm, and leading to the mainmast. The main-mast is furnished with a similar suit of sails, somewhat larger; the mizzen, also, though smaller than either, instead of a square sail on the lower mast, it has a gaff sail, hoisting up and down abaft the mast. Some ships have similar gaff sails on the fore and main masts, which are found of great use in gales of wind as a substitute for storm staysails. Most carry also light staysails between the masts; but they are

very troublesome and worse than useless. Studding sails extended on special spars outside the square sails when going large are very useful. The perfection of equipping a ship with spars, rigging and sails, consists in so disposing them, that, in a whole-sail breeze, the centre of effort of all the sails will be in the same line with the ship's centre of rotation; or that the efforts of the forward and after sails to turn the ship will be so exactly balanced as not to require any continued assistance from the rudder in either direction; for this, while it impedes her progress, does not leave the entire force of the rudder disposable when necessary to turn. Of the two evils, however, seamen have more patience with a ship disposed to approach the wind than with one needing the continued action of the helm to keep her from falling off.

Cargo and Ballast.— When the articles in a ship's cargo are heavy and light, the heavier are placed nearest the bottom, to increase the ship's stability. When, however, all are heavy, there may be danger of making a ship too stiff; so that, not being balanced, she will roll violently, and, perchance, risk the fracture of a mast, or even spring a leak. To obviate this danger the cargo should be raised; if iron, some should be stowed between decks; if coal or salt, it may be heaped up in the centre, taking care to secure it against shifting, should the ship be knocked down by a sea or squall. Heavy articles should never be placed toward the extremities, lest they promote pitching. The cargo and the ship should be considered as one integral whole, every precaution being taken in loading to preserve the proper relations between the centre of gravity and the centre of buoyancy. In all cases care must be taken to preserve the trim of the ship — that just proportion between her draft forward and aft which the estimate of the builder, or, when a voyage has been made, experience itself, has determined to be most favorable to rapid sailing. See also NAVIGATION; SHIPBUILDING.

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SHIP IN ART AND SYMBOLISM. As symbol of the State a ship has been used from very distant times; as such it is depicted as steered by its statesmen through the shoals, rocks and storms of internal troubles, false policies and the machinations of enemy countries. In Christian symbolism also the ship takes the same significance. It was depicted riding in safety amidst storms as emblematic of the Church in the early days surviving the direst persecutions. Frequently the mast and yard-arm are used to signify the Cross and the peak of the mast is surmounted by a dove or the sacred monogram. The symbol of the ship is dilated on by early Christian writers, as Saint Clement of Alexandria. In the Catacombs hanging lamps have been discovered in the form of masted ships, and the design appears frequently on the Catacomb walls. Sometimes the ark of Noah takes the place of the masted ship. Often, however, in ancient times, as at present, the ship is introduced as an emblem of maritime power. In ecclesiastical art a ship has been pictured in the hands of Saint Jude; Saint Ursula has been depicted with a ship near her, or as landing from a ship; Saint Melanius has been portrayed as lying dead on a ship which is sailing against the stream; Saint Castor has been pictured saving a ship from sinking; Saint Werenfrid has been represented with a ship in his hand having a coffin in it; Saint Anselm has been portrayed holding the model of a ship, as has Saint Mary of Succours (Husenbeth). The term ship is used for the ecclesiastical vessel that holds the incense, but it is usually of *boat* form. The finest centrepiece for the banquet tables of the Middle Ages was a ship of gold or silver made as a masterpiece of the goldsmith and termed a *nef*.

CLEMENT W. COUMBE.

SHIP CANALS. Great ship canals across isthmuses or peninsulas, to make shorter sea routes or avoid storm passages, or surmount falls, or to make seaports of inland cities, have been the speculations of dreamers for ages; but the developed and hurried commerce of this age has made some of them imperative. The ship canals of the world are 11 in number, as follows:

1. The Suez Canal (q.v.), begun in 1859 and completed in 1869.
2. The Cronstadt and Saint Petersburg Canal, begun in 1877 and completed in 1890.
3. The Corinth Canal, begun in 1884 and completed in 1893.
4. The Manchester Ship Canal, completed in 1894.
5. The Kiel Canal (q.v.), connecting the Baltic and North seas, completed in 1895. Enlarged 1906–14.
6. The Elbe and Trave Canal, connecting the North Sea and Baltic, opened in 1900.
7. The Welland Canal, connecting Lake Erie with Lake Ontario. See CANADIAN CANALS.
8 and 9. The two canals, United States and Canadian, respectively, connecting Lake Superior with Lake Huron.
10. The Panama Canal.
11. The Cape Cod Canal.

The canal connecting the Bay of Cronstadt with Saint Petersburg is described as a work of great strategic and commercial importance to Russia. The canal and sailing course in the Bay of Cronstadt are about 16 miles long, the canal proper being about 6 miles and the bay channel about 10 miles, and they together extend from Cronstadt, on the Gulf of Finland, to Saint Petersburg. The canal was opened in 1890 with a navigable depth of 20½ feet, the original depth having been about 9 feet; the width ranges from 220 to 350 feet. The total cost is estimated at about $10,000,000.

The next of the great ship canals connecting bodies of salt water in the order of date of construction is the Corinth Canal, which connects the Gulf of Corinth with the Gulf of Ægina. The canal reduces the distance from Adriatic ports about 175 miles and from Mediterranean ports about 100 miles. Its length is about four miles, a part of which was cut through granite soft rock and the remainder through soil. There are no locks, as is also the case in both the Suez and Cronstadt canals, already described. The width of the canal is 72 feet at bottom and the depth 26¼ feet. The work was begun in 1884 and completed in 1893 at a cost of about $5,000,000. The average tolls are 18 cents per ton and 20 cents per passenger.

The Manchester Ship Canal, which connects Manchester, England, with the Mersey River, Liverpool, and the Altantic Ocean, was begun 11 Nov. 1887 and opened for traffic 1 Jan. 1894. The length of the canal is 35½ miles, the total rise from the water level to Manchester being 60 feet, which is divided between four sets of locks, giving an average to each of 15 feet. The minimum width is 120 feet at the bottom and averages 175 feet at the water level, though in places the width is extended to 230 feet. The minimum depth is 26 feet, and the time required for navigating the canal from five to eight hours. The total amount of excavation in the canal and docks was about 45,000,000 cubic yards, of which about one-fourth was sandstone rock. The lock gates are operated by hydraulic power; railways and bridges crossing the route of the canal have been raised to give a height of 75 feet to vessels traversing the canal, and an ordinary canal whose route it crosses is carried across by a springing aqueduct composed of an iron caisson resting upon a pivot pier. Cost, $75,000,000.

Two canals connect the Baltic and North seas through Germany, the first, known as the Kaiser Wilhelm Canal, having been completed in 1895 and constructed largely for military and naval purposes, but proving also of great value to general mercantile traffic. Work upon the Kaiser Wilhelm Canal was begun in 1887, and completed in 1895. The total excavation amounted to about 100,000,000 cubic yards, and the cost about $40,000,000. See KAISER WILHELM CANAL.

The Marseilles-Rhone Canal was begun in April 1911. It is about 50 miles long. For the first three miles out of Marseilles it is hardly a canal, properly speaking, being located off shore. It then turns sharply, and a tunnel of four and one-half miles passes under the mountain ridge near the shore; it next proceeds by the easiest overland route to the Rhone at Arles.

Three ship canals intended to give continuous passage to vessels from the head of Lake Superior to Lake Ontario and the Saint Lawrence River are the Welland Canal, originally constructed in 1833 and enlarged in 1871 and 1900 (see CANADIAN CANALS); the Saint Mary's Falls Canal at Sault Sainte Marie, Mich., opened in 1855 and enlarged in 1881 and 1896; and the Canadian canal at Saint Mary's River, opened in 1895. In point of importance, measured at least by the present use, the canals at the Saint Mary's River by far surpass that of the Welland Canal, the number of vessels passing through the canals at the Saint Mary's River being eight times as great as the number passing through the Welland, and the tonnage of the former being nearly 40 times as great as that of the latter. The traffic is, in fact, heavier than that through the Suez Canal, being about two and a half times as much. One of the important products of the Lake Superior region, iron ore, is chiefly used in the section contiguous to Lake Erie, and a large proportion of the grain coming from Lake Superior passes from Buffalo to the Atlantic Coast by way of the Erie Canal and railroads centring at Buffalo. The most important article in the westward shipments through the Sault Sainte Marie canals — coal — originates in the territory contiguous to Lake Erie. These conditions largely account for the fact that the number and tonnage of vessels passing the Saint Mary's River canal so greatly exceed those of the Welland Canal. During the season of 1915, from April to December, 21,233 vessels, with a total tonnage of nearly 50,000,000, passed through both these canals, 16,910 using the American and 4,323 vessels using the Canadian. In 1907 work was begun on enlarging the lock of the American canal, which is now almost completed, being opened for traffic in 1914. It is 80 feet wide and 1,350 feet between gates, the masonry being 1,750 feet in length. It can accommodate two of the biggest lake steamers at once and be filled or emptied within six minutes.

The Cape Cod Canal is of recent construction; it was begun in 1909 and opened to traffic 1 Aug. 1914, to vessels drawing only 18 feet of water, but since 1 Oct. 1915 vessels of 20 feet draught have been able to pass through. It connects Barnstable Bay with Buzzard's Bay, Mass., thus saving the coastwise shipping the dangerous navigation around Cape Cod. The canal is 12 miles long, sea-level in construction and has a minimum depth of 30 feet. Up to the end of 1915 over 9,000 vessels had passed through, including a number of gunboats and submarines of the United States navy. Electric illumination from one end of the canal to the other makes night navigation possible. The tolls range from $3 for motor boats to $70 for larger freight steamers.

In 1915 the State legislature of New Jersey authorized the State Board of Commerce and Navigation to continue a survey for a canal from Bordentown, on the Delaware River, to Morgan on Raritan Bay, to be 33 miles in length and to cost $45,000,000, as estimated in 1911. This project is in connection with the Federal plan involving a series of inland waterways running down the coast out of range of the guns of warships that might attempt to blockade the coast. On 3 March 1905 Congress passed a River and Harbors Act, which authorized a survey "for the construction of a continuous waterway, inland where practicable, from Boston to Beaufort, N. C.," the minimum depth of which was to be 25 feet, suitable for army, navy and commercial purposes. In 1912 Congress made an appropriation, in continuance of this project, for the purchase of the old Albemarle and Chesapeake Canal and its improvements. In 1913 General Bixby, chief of engineers, had prepared a detailed plan with estimates for the contemplated waterway, involving a total cost of $30,000,000.

SHIP-FEVER. See TYPHUS FEVER.

SHIP-MONEY, a tax which had much to do with provoking the rebellion which cost Charles I his head. It was customary in England in times of extraordinary peril for the

sovereign to call upon the seaports and maritime counties to supply ships-of-war for the national defense. The ships which took part in the defeat of the Spanish Armada were obtained in this way. No such peril existed when Charles I, in October 1634, ordered the magistrates of London and other seaport towns to provide ships-of-war, and also empowered the magistrates to levy a tax for that purpose. Resistance to the levy was met by further decrees, extending the tax to the whole kingdom, and directing that every landholder and other inhabitant be assessed according to his means, and the tax collected by distress if necessary. When John Hampden refused to pay the tax, and was brought to trial, the judges decided, eight to four, in favor of the Crown. One of the early acts of the Long Parliament in 1640 was to declare the ship-money tax illegal and no attempt has since been made to collect ship-money in England.

SHIP RAILWAY, a railroad for transporting vessels from one body of water to another. Capt. J. B. Eads' plan for the Tehuantepec Ship Railway across the isthmus between North and South America, in Mexican territory, attracted great attention, though it was never constructed. It consisted essentially of a series of some 8 or 10 tracks, having a carrying car or cradle of some five sections, with altogether 1,000 wheels. Calculated for a vessel of 10,000 tons, this would not give a pressure so great as that of an ordinary locomotive. A ship-railway is in operation by the Canadian government between Chignecto Bay, in the Bay of Fundy, across the isthmus to Northumberland Straits, a distance of 17 miles. This enables vessels to go from Prince Edward Island to Saint John, New Brunswick, in 12 hours, and greatly facilitates the transport of grain in bulk from the lake ports to New Brunswick. The vessels are raised by hydraulic pressure a height of 40 feet to the level of the railway, and placed on a double track 18 feet from centre to centre. The flexible car system of ship-railway invented by William Smith, harbor engineer of Aberdeen, Scotland, is designed to allow the use of ordinary railway gradients. The car is in sections, each carried on a compound bogie running on parallel lines. Vertical and lateral flexibility are secured, and the ship is sustained on the car by water cushions, so that it is virtually kept floating. The ship is raised onto the cars by means of a submerged shipway enclosed within a wet dock.

SHIP REGISTRY ACT approved 18 Aug. 1914, provided for the admission of foreign-built ships to American registry for foreign trade, and for other purposes. In section 5 of the act entitled 'An act to provide for the opening, maintenance, protection and operation of the Panama Canal and the sanitation and government of the Canal Zone,' the words «not more than five years old at the time they apply for registry," were repealed. The President of the United States was authorized, whenever in his discretion the needs of foreign commerce may require, to suspend by order, so far and for such length of time as might be desirable, the provisions of law prescribing that all the watch officers of vessels of the United States registered for foreign trade should be citizens of the United States. Under similar conditions the President was also authorized to suspend the provisions of the law requiring survey, inspection and measurement by officers of the United States of foreign-built vessels admitted to American registry under this act.

SHIP RIGGING. The many special terms used to designate the various parts of the standing and running rigging in the days of the sailing vessel are given below:

THE STANDING RIGGING.

Bobstay.
Bowsprit-shroud.
Martingale-stay.
Jib-boom guys.
Fore-stays.
Fore-topmast stays.
Inner-jib stay.
Outer-jib stay.
Flying-jib stay.
Fore-royal stay.
Fore-rigging.
Fore-topmast rigging.
Fore-topgallant rigging.
Fore-cap back-stay.
Fore-topmast back-stays.
Fore-topgallant back-stays.
Fore-royal back-stay.
Fore-lift.
Fore-topsail lift.
Fore-topgallant lift.
Fore-royal lift.
Main-stays.
Main-topmast stays.
Main-topgallant stays.
Main-royal stays.
Main-rigging.
Main-topmast rigging.
Main-topgallant rigging.
Main-cap back-stay.
Main-topmast back-stays.
Main-topgallant back-stays.
Main-royal back-stays.
Main-lift.
Main-topsail lift.
Main-topgallant lift.
Main-royal lift.
Mizzen-stays.
Mizzen-topmast stays.
Mizzen-topgallant stay.
Mizzen-royal stay.
Mizzen-rigging.
Mizzen-topmast rigging.
Mizzen-topgallant rigging.
Mizzen-cap back-stay.
Mizzen-topmast back-stays.
Mizzen-topgallant back-stays.
Mizzen-royal back-stays.
Crossjack lift.
Mizzen-topsail lift.
Mizzen-topgallant lift.
Mizzen-royal lift.
Jigger-stays.
Jigger-middle stay.
Jigger-topmast stay.
Jigger-topgallant stay.
Jigger-rigging.
Jigger-topmast rigging.
Jigger-topmast back-stays.
Jigger-topgallant back-stays.

THE RUNNING RIGGING.

Fore-tack.
Fore-sheet.
Fore clew-garnet.
Fore-braces.
Fore lower topsail sheet.
Fore lower topsail clew-lines.
Fore lower topsail braces.
Fore upper topsail sheets.
Fore upper topsail clew-lines.
Fore upper topsail braces.
Fore lower topgallant sheet.
Fore lower topgallant clew-lines.
Fore lower topgallant braces.
Fore upper topgallant sheet.
Fore upper topgallant clew-lines.
Fore upper topgallant braces.
Fore-royal sheet.
Fore-royal clew-lines.
Fore-royal braces.
Fore-topsail halyards.
Fore-topgallant halyards.
Fore-royal halyards.
Fore-signal halyards.
Fore reef-tackles.
Fore topsail reef-tackles.
Main-tack.
Main-sheet.
Main clew-garnet.
Main-brace.
Main lower topsail sheet.
Main lower topsail clew-lines.
Main lower topsail brace.
Main upper topsail sheet.
Main upper topsail clew-lines.
Main upper topsail braces.
Main lower topgallant sheet.
Main lower topgallant clew-lines.
Main lower topgallant braces.
Main upper topgallant sheet.
Main upper topgallant clew-lines.
Main upper topgallant brace.
Main-royal sheet.
Main-royal clew-lines.
Main-royal braces.
Main-topsail halyards.
Main-topgallant halyards.
Main-royal halyards.
Main signal-halyards.
Main reef-tackles.
Main-topsail reef-tackles.
Crossjack tack.
Crossjack sheet.
Crossjack clew-garnet.
Crossjack braces.
Mizzen lower topsail clew-lines.
Mizzen lower topsail braces.
Mizzen upper topsail sheet.
Mizzen upper topsail clew-lines.
Mizzen upper topsail braces.
Mizzen lower topgallant sheet.
Mizzen lower topgallant clew-lines.
Mizzen lower topgallant braces.
Mizzen upper topgallant sheet.
Mizzen upper topgallant clew-lines.
Mizzen upper topgallant braces.
Mizzen-royal sheet.
Mizzen-royal clew-lines.
Mizzen-royal braces.
Mizzen-topsail halyards.
Mizzen-topgallant halyards.
Mizzen-royal halyards.
Mizzen-signal halyards.
Crossjack reef-tackles.
Mizzen-topsail reef-tackles.
Jigger peak-halyards.
Jigger brails.
Jigger gaff-topsail sheet.
Ensign halyards.
British ensign.
Gaff-topsail halyards.
Vangs or Vanes.
Boom topping lift.

THE RUNNING RIGGING—continued.

Boom guys.
Boom sheet.
Flying-jib sheet.
Outer-jib sheet.
Inner-jib sheet.
Fore-topmast stay-sail sheet.
Fore-bowline.
Main-topmast stay-sail sheet.
Main topgallant stay-sail sheet.
Main-royal stay-sail sheet.
Mizzen-topmast stay-sail sheet.
Mizzen-topgallant stay-sail sheet.
Mizzen-royal stay-sail sheet.
Jigger stay-sail sheet.
Jigger-topmast stay-sail sheet.
Jigger-topgallant stay-sail sheet.
Reef points.
Fore-buntlines.
Main-buntlines.
Crossjack buntlines.

SHIPBUILDING INDUSTRY AND CONSTRUCTION. The earliest history of shipbuilding and the development of the sailing ship and the steam ship will be found under the titles SAILING VESSELS; STEAM VESSELS.

United States.— In the United States shipbuilding began with the *Virginia,* launched in 1607 at the mouth of the Kennebeck River, by the Popham colony. This little vessel was of the type of the English pinnace, and though of but 30 tons, it several times made the crossing of the Atlantic in safety. The first decked-over vessel built in America was the *Onrust,* launched in 1614 at New Amsterdam. In 1621 the *Blessing of the Bay,* launched at Medford, Massachusetts, was the first of the unnumbered fleet which from that time forward slipped one by one down the ways of the colony's many shipyards into the waters of Massachusetts.

The most conspicuous advance in that period was Dominie Peters's 'great ship» of 300 tons, launched at Salem in 1641. This notable vessel exceeded the famous *Mayflower* by 120 tons, and set the pace not only for the shipbuilders of the New World, but for the Old World as well, where few vessels so large had been equal to this product of a mere colony scarce 20 years old.

By 1676 the ports of Massachusetts had 30 ocean-going vessels of between 100 and 250 tons, besides some 700 smaller vessels engaged in the coasting trade. In 1700 Boston was the home port of 194 ocean ships, while New York boasted but 124. In the 40-year period from 1674 to 1714 the Massachusetts records show the launching of more than 1,000 ships for the American merchant fleet, and 240 others which were sold abroad to foreign owners. The great abundance of the finest ship timber in the American forests — oak, white pine, and pitch pine — gave particular impetus to American shipyards, for English forests had begun to show serious depletion; and many shiploads of American shipbuilding timber were sent annually to British shipyards from the ports of Maine and New Hampshire.

While Massachusetts and New York had been the pioneers in American shipbuilding, the other colonies had speedily followed the example; in the Earl of Sheffield's 'Observations on the Commerce of the American States' (London 1783), a record of American shipbuilding for the year 1769 shows the number of ships built in that year by each Colony, and their aggregate tonnage in preceding table.

COLONY	Number built	Aggregate tonnage	Average tonnage
Massachusetts	137	8,013	60
New Hampshire	45	2,452	55
Connecticut	50	1,542	31
Pennsylvania	22	1,469	67
Rhode Island	39	1,428	37
Maryland	20	1,344	65
Virginia	27	1,269	47
New York	19	955	50
South Carolina	12	789	65
North Carolina	12	607	50
New Jersey	4	83	20
Georgia	2	50	25

By 1770 Massachusetts was building half the total number of ships constructed in America.

In 1791 Alexander Hamilton, as Secretary of the Treasury, reported that the American merchant marine aggregated 476,274 tons. In 1800 the record for the year was 995 ships, with a combined tonnage of 106,000 tons. Shipbuilding industry in the United States reached its apex in 1855, the launching in that year numbering 2,027 vessels, and the sales abroad amounted to 65,887 tons, chiefly added to the British marine. The threat of withdrawal of mail subsidies by Congress had its effect in diminishing shipbuilding, as the best class of American vessels could not be run without them. When the threat became a fact in 1858 the doom of the American lines was sealed and the carriage of the American mails was transferred to the heavily subsidized ships of Great Britain. See MERCHANT MARINE OF THE UNITED STATES.

Shipbuilding on the inland waters of the country began in 1800 when the *Saint Clair,* of 110 tons, was launched at Marietta, Ohio, and the *Monongahela Farmer,* of 250 tons, was launched at Elizabeth, Pa. These were both full-rigged ships and set sail on the Ohio for the Gulf and thenceforward belonged to the ocean fleet. The *Louisiana,* of 300 tons, launched in 1804 at Pittsburgh, was the most notable of the ships built in those days in the interior.

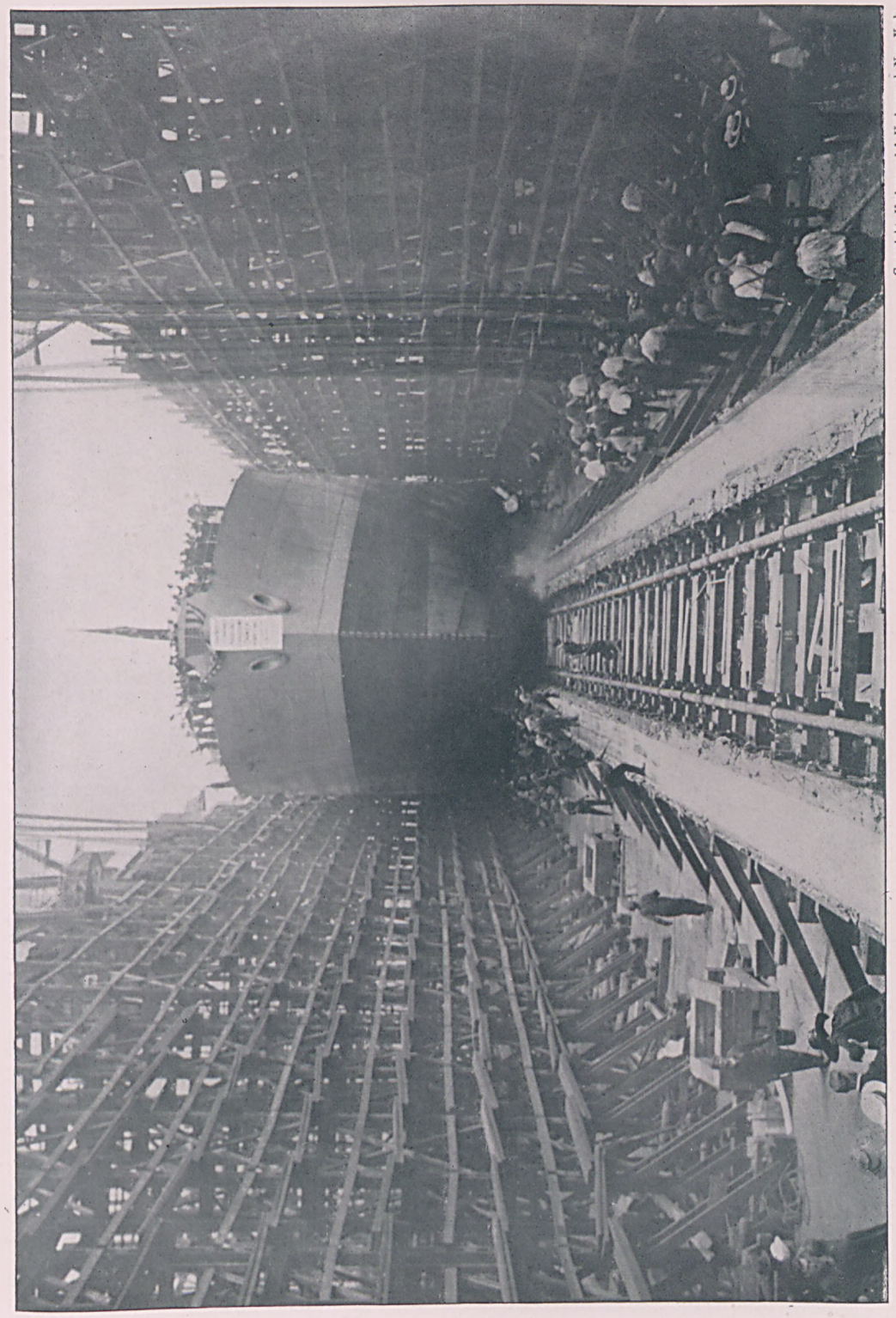
The change from wood to iron in ship construction about the middle of the 19th century, was followed by the revolutionary methods of steel shipbuilding, and by 1890 steel had displaced iron in the shipyards of Great Britain and the United States. American shipbuilding under the era of steel reached its perfection in 1892 and 1896, when the *Saint Louis* and the *Saint Paul,* two ocean liners, were built by the Cramp Company. These vessels were constructed entirely of domestic material, thus marking a new era in American shipbuilding.

Steel-Schooners.— The use of steel in the construction of the modern passenger steamships (see STEAM VESSELS) and of the modern naval vessel (see WARSHIPS) developed the steel freighter, the merchant schooner with four, five, six or seven masts. Indeed the development of the multi-masted merchant schooner, which has advanced with such rapid strides during the past few years, is one of the most remarkable features in the shipbuilding industry of the Atlantic coast. The fore-and-aft schooner has always been a favorite type of ship in the American merchant trade, whether coasting or deep-sea, and the great breadth of hull and length of spars of such craft have rendered them an easily recognized type the world over. As compared with the square-rigged vessels of the schooner, brig, brigantine, or bark type, the American fore-and-after has the advantage of being a better craft when sailing close-hauled and of requiring fewer men to man it. In an earlier day of the development of our merchant marine in the coasting trade, the two-masted schooner was the common type; then came the three-masted schooner, and this was followed by vessels of four, five, six and now seven masts. The

carrying capacity of these schooners, the largest of which are engaged almost entirely in the coal-carrying trade, is exceedingly large. Thus, the five-masted schooner is 318 feet in length, 44 feet beam, and 21½ feet in depth. The vessel will carry 4,000 tons of coal on her maximum draft. A six-masted schooner is 330 feet in length, 48 feet in beam, and has 22 feet depth of hold. On her maximum draft of 24 feet she will carry 5,500 tons of cargo. Her lower masts are each 116 feet in length, and her topmasts 58 feet.

The seven-masted steel schooner of modern build has a bar keel of forged steel three and one-half inches in width by 12 inches in depth, which extends from stem to sternpost. There is a cellular double bottom with a continuous, single, vertical, keel plate weighing 22.5 pounds to the square foot. The upper bilge-strake is of 28¾-pound plate for two-thirds of the length. The middle bilge-strake is of 30 pounds weight for the same distance and the lower bilge-strake 25 pounds. The bottom strake is of 20-pound plate, while the garboard strake is of 29-pound plate for two-thirds of the length. All of the plating reduces to 18¾ pounds at the ends of the vessel, except in the case of the garboard strake, which will reduce to 25 pounds at the ends. There are three complete decks, which are of steel plating, the upper deck, forecastle and poop-deck being wood-covered. A collision bulkhead is worked in at a suitable distance from the stem. The lower masts throughout the vessel are built of steel, with lapped edges, flush butts, and stiffening angles extending inside for the full length. The plates are single-riveted at the edges and double-riveted at the butts. The plating is double and stiffening double at the mast-partners and at the hounds. The masts are all 135 feet in length from the mast step to the top of the upper band, and they have a uniform diameter throughout of 32 inches. The topmasts are of Oregon pine. They are 58 feet in length over all, tapering from 18 inches in diameter to 10 inches, except the foremast, which is 64 feet in length and 20 inches at its point of greatest diameter. The booms of the first five masts are 45 feet in length by 14 inches in diameter, the spanker boom being 75 feet in length by 18 inches in diameter. The total sail area of the lower sails and topsails is 40,617 square feet. All of the standing rigging, and in special cases the running rigging for the lower sails, are of a high quality of wire rope. Although this vessel is propelled entirely by sails, she carries quite a considerable instalment of machinery, including one 9-inch by 10-inch Hyde double-cylinder ship engine, and five 6-inch by 8-inch Hyde hoisting engines. There are two vertical boilers 56 inches in diameter by 90 inches high, one in the forward house and one in the after house. The boilers were built for a working pressure of 100 pounds to the square inch. There are two 8-inch by 4-inch by 6-inch duplex pumps and two direct-acting steam pumps, with steam and water cylinder, each 12 inches in diameter by 12 inches stroke. As the result of the installation of steam power on board for the purpose of hoisting anchors and sails the number of hands necessary to work this large vessel is considerably reduced, the total number required being only 19 men. The total cost of the vessel delivered was about $250,000.

Steel Steamships.— The modern ocean liner for freight and passengers, as built of steel, has a length over all of 630 feet; breadth, 73 feet 6 inches; molded depth from keel to upper deck, 56 feet. On a draft of 33 feet the displacement is 33,000 tons, and on a maximum draft of 36½ feet, to which the vessel can be loaded whenever the depth of the harbors will admit of it, the displacement will be 37,000 tons. The space occupied by machinery is the smallest practicable, so that space for cargo may be as large as possible. In order that cargo may be readily stowed, the ordinary type of hold pillar has been dispensed with, and large box-shaped columns are fitted, supporting heavy girders which run longitudinally under the transverse beams which carry the decks. These columns are widely spaced, and in some cases only one is fitted in a hold, whereas by the older method 10 pillars would be required. A longitudinal bulkhead is fitted the whole length of the ship; this divides each hold into two separate compartments, and, therefore, the hatches are fitted in pairs, one to each hold. Some of the hatches are so large that bulky freight, such as a locomotive or freight car, or large marine or land boilers, can be lowered directly into the hold. Every hatch can be loaded or discharged simultaneously if desired. The cargo-handling plant on such a vessel is very complete, and designed so as to cut down the number of men to a minimum. Two winches and two booms are fitted to handle cargo at each hatch. The booms, 34 in number, are built of steel. Two heavy booms are fitted to lift weights of from 30 to 50 tons. The winches for cargo handling are 34 in number, all electrically operated. One hold in the ship is devoted to carrying frozen meat, and is completely insulated; its capacity being about 2,500 tons. The insulation is so arranged that ordinary cargo can be carried on return trip. The coal bunkers are located above the boilers; the ends of the bunkers being inclined in such a manner that the bulk of the coal will gravitate through chutes and be deposited on the firing platform. The capacity of the permanent bunker is over 4,000 tons, and a reserve bunker is fitted contiguous to the boiler room, having a capacity for about 2,000 tons of coal. The boilers have a working pressure of 260 pounds per square inch. They will supply steam to two main engines of the triple-expansion type, arranged side by side, working separate shafts. The propeller wheels are 20 feet in diameter, and revolve 78 times per minute. The horse power of the engines would be about 10,000, and will drive the ship at a speed of about 14 knots per hour. To realize the great size of the ship, one must but recapitulate the various decks, platforms, etc., from the keel to the top-most bridge. First there is the outer bottom of the ship; 6 feet above that is the inner bottom or floor; then within the molded or plated structure of the vessel are the orlop, lower, between, main, and upper decks. All of these decks are of steel plating, and the whole structure of the ship from the bottom to the upper deck is 56 feet in height, the upper deck running in an unbroken sweep the whole 630 feet length of the vessel. Above the upper deck are the promenade deck, the upper promenade deck, and the boat deck, this last being about 80 feet above the keel, while eight



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Launching the steel cargo vessel "Pipestone County" at Hog Island shipyard

feet above this, or 88 feet above the keel, is the captain's bridge. Now, since the vessel at her lightest draft draws 17 feet of water, the captain's bridge, when the vessel is running light, will be over 70 feet above the water, and the passengers on the topmost upper deck will be between 60 and 70 feet above the water. See SHIP.

The United States Shipping Board.—When the United States entered the World War in 1917 the preponderant demand of the army was for ships to transport men and materials to Europe. The United States Shipping Board was formed to control generally the increase and operation of the necessary ocean-going fleet, and this board established as a subsidiary the Emergency Fleet Corporation. The government advanced $50,000,000 capital to the latter body, taking the entire issue of stock to that amount. The duty laid upon the corporation was the providing of the largest possible ship tonnage in the shortest possible time. It began its labors by taking over a large number of the existing shipyards of the country and entering upon the construction of new ones in all sections of the country whence ships could be brought to deep water. Besides these activities the structural steel works everywhere were set to work fabricating parts of ships which were later to be assembled at the shipyards. In August 1918 the corporation had under its control more than 200 shipyards, half of which it had built. These were distributed over 27 different States, and aggregated nearly 900 ways with a maximum capacity for fabricated ships of 5,400 ships per annum. The actual output was held down to about half of this figure owing to inability to get materials fast enough, and the necessity of training the large forces of unskilled labor. Advantage was taken also of yards formerly in use for the building of wooden ships, especially in the South and on the Pacific Coast, where ship timber was plentiful and within easy reach.

The largest of these new yards was that at Hog Island near Philadelphia where nearly 30,000 men were employed. Efforts were made to celebrate the Fourth of July 1918 by the launching of 100 ships throughout the country. While the goal was not quite reached, more than 90 ships were actually sent into the water on that day. As an instance of the remarkable efficiency attained in some yards the *Tuckahoe* may be cited. This vessel was a 5,500-ton steel collier of the fabricated type, and was erected in 27 days at a Camden (N.J.) shipyard. On the 40th day from the date the keel was laid this vessel put to sea with a full cargo.

At the yards on the Great Lakes the possible size to which ocean-going ships might be built was limited by the size of the locks in the Welland Canal to a length of not more than 261 feet and a beam not exceeding 42½ feet. These limitations were overcome in part by building a ship in two sections and assembling the parts when they reached tidewater in the Saint Lawrence. However, the width of the ship inexorably held them down to a limited length, not exceeding 350 feet and limited the tonnage to about 6,000 tons.

The work accomplished by the United States Shipping Board is best comprehended by comparing the present tonnage of the American merchant marine with that existing immediately previous to the outbreak of the war. In June 1914 the total gross tonnage under the United States' flag, including the coastwise shipping and the fleet on the Great Lakes was 4,287,000 tons. In 1920 the gross tonnage was 12,406,123 tons, an increase of 283 per cent. The larger part of this increase has been in ocean-going vessels. The steam tonnage of the United States is now about 25 per cent of the entire tonnage of the world.

At the close of August 1919 the Shipping Board reported the delivery of 899 steel steamships, of 5,733,622 deadweight tons; 378 wooden steamships of 1,339,103 deadweight tons; and 15 composite ships of 32,500 deadweight tons — a total of 1,292 ships aggregating a deadweight tonnage of 7,125,225 tons. There were fitting out in wet basins 408 steamships aggregating 1,920,000 deadweight tons. There were on the ways in the several yards under the board's control 497 ships, aggregating 3,286,105 deadweight tons, and 227 steel steamships of a combined tonnage of 1,476,610 tons are still under contract but have not been begun.

At the close of August 1919 the Shipping Board had a total fleet of 1,280 ships under its control, with a combined tonnage of 7,706,400 deadweight tons. See, also, AMERICAN SHIPBUILDING; NAVAL ARCHITECTURE.

Ship Construction.— As the first step in the building of a ship is the designing of it, the use to which it is to be put must first be decided on. What cargo is it to carry and how much? And what speed is desired? The answer to these questions will go far to determining the ship's dimensions — length, beam and depth — and to a large extent the shape or "lines" of the under-water body and the horse power of its propelling machinery. The available depth of water in the harbors the ship is designed to visit is another controlling factor.

As the dimensions of the ship are not known, a trial design is first calculated upon the basis of the tonnage required; say, for example, 10,000 tons. The designer makes a calculation of a hull which will afford the space for 10,000 deadweight tons. The displacement of the completed ship will be the deadweight tonnage plus the weight of a hull to contain it. From experience and experiment is has been found that about 64-100ths of the whole carrying capacity (including engines, fuel, stores, etc.) must be added for the vessel itself. The ship carrying 10,000 tons will, therefore, have a displacement of about 16,400 tons. It devolves then upon the designer to determine length, beam and depth for his vessel from this total displacement. Into this problem enters first, if at all, the available depth of water in the harbors where the ship will trade. The shallower the possible draught, the greater, relatively, the beam. Aside from this the desired speed determines the proportion of length to breadth. The longer the ship — and the narrower — the speedier will she move for the same engine power. A trim underwater body with long gently flowing curves will require less horse power for a given speed than a body which is full and roomy well up to the bow and back to the stern.

For all of these calculations «constants» and «coefficients» are available to the constructor,

and his ship of 16,000 tons will, in ordinary course, figure out a length of between 450 and 470 feet and a beam of 55 to 60 feet, a draught of 25 to 28 feet, with a total depth of about 40 feet. With engines of 4,000 horse power this vessel should show a speed of about 12 knots.

In the planning of the ship the established rules of the several "Lloyds" and classification committees must be strictly adhered to in order that the vessel may be duly registered.

The chief factor in the hull of the ship is the shell plating. All other constructive parts of the ship, that is, the framing, are to be considered as practically the support and stiffening of the shell. In a large vessel the pressure of the water upon its exterior shell is enormous, the tendency being to cause a collapse. This pressure is tremendously increased by the violent blows of storm waves, and from the pitching and rolling sustained in rough water. Herein lies the demand for the knowledge of the skilled engineer, that the metal of which the ship is constructed shall be so disposed as to afford abundant strength and resistance to every possible stress and strain from without. Another series of strains arises from the load carried by the vessel, and acting from within, of great magnitude when the waves are high and the ship is subjected to a hogging strain when lying across the crest of a great wave, or to a sagging strain when lying across the trough between two waves. It is customary to regard the ship as a section of a tubular bridge, so far as the amidship's part is concerned. The ends of the vessel from their wedge-shaped construction are from that condition relatively stronger and may safely be more lightly built. The art of the shipbuilder is in the skilful adjustment of material to its purpose, so disposing it as to afford abundant strength, without interfering with generous cargo capacity.

In the more recent development of ship construction the system most approved is the longitudinal, as opposed to the transverse; the former having the advantage of stiffening the plating against transverse buckling as well as against fore-and-aft compression, a feat not attained by the transverse method of construction except by an undue and undesirable thickness of the plating and a close placing of the side frames — thus adding unprofitable weight and diminishing cargo space.

The division of the hull into watertight compartments is a feature of present shipbuilding regarded as indispensable, particularly as regards the "collision bulkhead," placed near the bow, to keep out the sea in case the bow is broken by collision. The requirements of the Lloyds associations are that the compartments shall be of such a limited size that the vessel may still float safely if two of them are breached. This provision demands at least eight transverse bulkheads in the ordinary passenger liner. The compartments are connected by water-tight sliding doors which are operated by compressed air from the bridge, in case of emergency.

Given the hull, the remaining problem is its propulsion. A certain model of hull will be found to have a definite economic speed. Above this speed the engines labor without corresponding effect. This economic speed can be very closely calculated by the shipbuilder from the under-water lines of his model for the load of cargo it is to carry. He is thus able to decide upon the size of the propeller or propellers needed — their diameter and pitch, and the number of revolutions they must make per minute to drive the ship at the desired rate. Engines powerful enough to turn the propeller easily and without strain the calculated number of revolutions may then be designed. One more problem remains, that of so attaching the engines to the ship that they actually form an integral part of its construction. The whole problem of propulsion is one of delicate adjustment. The engine will run best at a certain speed, and the vessel will run best at a certain speed. The closer these two conditions can be matched, the more successful and the more durable the ship. In most vessels nothing better than a compromise is reached. The instances in which hull and engines are really mated are so rare as to excite admiration — and incidentally to mark the possibilities to be achieved.

The reciprocating engine is of satisfactory efficiency for moderate speeds, ranging up to 0.88 for triple expansion and 0.92 for quadruple expansion engines. The latter are more economical of fuel, but require so much more engine room that little if any advantage is gained on the average voyage. The steam turbine is equal in efficiency to the quadruple expansion reciprocating engine, and does equal work with considerably less fuel, but, as it cannot be run astern, a second turbine must be provided for this purpose, or a transformer employed. Furthermore the turbine is of great efficiency only at high speeds — too high to allow of its being connected directly to the propeller shaft. A combination of reciprocating engines and the turbine has worked well, where the turbine has been of the low pressure type and runs by the exhaust steam of the reciprocating cylinders. With triple screws on large vessels (20,000 tons and upward) the two wing shafts are operated by reciprocating engines and the centre shaft by the turbine. Turbines of the high speed type are successfully utilized when employed to run electric generators which, in turn, operate the shafts by electric drive.

It is quite impossible in the limits of space available in this work to even touch upon the multitudinous details of practical ship construction. For this information the student is referred to the excellent and complete treatises named below. See SHIP; SHIPBUILDING TERMS.

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SHIP-SAILING. See NAVIGATION.

SHIPIBO, shē-pē'bō, South American Indian tribe of Panoan stock, living in the forested regions of the upper Ucayali River, Peru. Their existence was reported by Franciscan missionaries who visited them in 1651, but a mission established for them in 1764 was, after a brief period of success, massacred in 1767, and the Shipibos have since rarely come in contact with the whites. They are great wanderers with no fixed places of migration, and are skilled boatmen and fishermen.

SHIPKA PASS, Balkan Peninsula, extends between Bulgaria and the territory formerly known as Eastern Rumelia, since 1885 incorporated with Bulgaria, at a height of 4,600 feet above sea-level, and is 87 miles distant from Rustchuk and 50 miles northeast of Philippopolis. In the hot fight between the Russians and Turks, 1877, the Russians held the position and Suleiman Pasha lost 20,000 men in his attempt to take Fort Nicholas, on the summit of the pass, 21–26 Aug. and 9–17 Sept. 1877.

SHIPLEY, England, a town of Yorkshire (West Riding), lies three miles north-northwest of Bradford, on the river Aire. The large parish church of Saint Paul is a fine modern Gothic specimen. The principal industry is the manufacture of woolens and cloths, and the quarrying of stone. Pop. 27,700.

SHIPPEN, William, American surgeon: b. Philadelphia, Pa. 16 Oct. 1736; d. Germantown, Pa., 11 July 1808. He was graduated at Princeton in 1754, took his M.D. at the University of Edinburgh in 1761 and engaged in practice at Philadelphia in 1762. He began the first series of lectures on anatomy given in America, at Philadelphia, in 1762, and in 1765 became professor of anatomy and surgery at the newly-established medical school at the College of Philadelphia; from 1780 until he retired in 1806 he was professor of anatomy, surgery and obstetrics at the University of Pennsylvania. In 1777–81 he was director-general of the military hospitals of the United States.

SHIPPENSBURG, Pa., borough in Cumberland County, 38 miles southwest of Harrisburg, on the Cumberland Valley, the Western Maryland and the Philadelphia and Reading railroads. The borough was settled in 1750. The Cumberland Valley State Normal School is located here. Industries include railroad machine shops and manufactures of clothing, hosiery and furniture. Pop. (1920) 4,372.

SHIPPIGAN, shĭp-ĭ-găn', Canada, a seaport town of Gloucester County, New Brunswick at the southeastern entrance to Chaleur Bay, opposite Shippigan Island, 70 miles east of Bathurst. It is a terminus of the Intercolonial Railway system, and has steam-ferry communication with Saint George's Bay, Newfoundland. It has a fine harbor, a maritime trade and valuable fisheries. Beyond Shippigan Island, Miscou Island is frequented by sportsmen for plover, the best in Canada.

SHIPPING, Law of. See MARITIME LAW.

SHIPPING ARTICLES. See SEAMAN.

SHIPPING AND SHIPBUILDING TERMS. The more common terms used in shipbuilding have been gathered here for the convenience of the student who wishes to read the articles on ship and shipbuilding.

ABAFT.— Behind, at the rear; as, abaft the beam, that is somewhat within a semi-circle to the rear of a vessel's beam. See BEAM in this article.

AFT.— At, near or toward the stern of a vessel.

AFTER PERPENDICULAR.— A vertical straight line directly aft of the rudder post.

ANCHOR.— A heavy steel or iron instrument, attached by a chain or hawser at the bow of a vessel, for dropping to the bottom and holding a ship that is not tied to a dock. It usually has a ring or shackle in the head, a longitudinal shank, and a cross arm ending in flukes. See SEA-ANCHOR in this article.

ATHWARTSHIP.— Across the ship, at right angles to the keel.

BALLAST.— Any weight or weights, as sea water, coal, pig iron, etc., placed in the lower part of a vessel to help keep her upright. A vessel without cargo usually requires ballast to prevent her being top-heavy.

BARK.— A two-masted vessel square rigged on the foremast and sloop-rigged aft.

BEAM.— An athwartship member supporting a portion of a deck; also an imaginary line at right angles to the keel; also the width of a ship; also a straight steel framing member as an I-beam.

BELOW.— To make a rope fast by turning it around a cleat.

BELOW.— Any part of a ship below a deck; the equivalent of the landsman's "down stairs."

BERTH.— A bunk or bed as for a sailor; also a place for a ship to lie.

BILGE.— The slightly rounded or flattish portion of a ship's hull, between the side and the bottom; the bulge or degree of curvature from the flat, used with reference to either the inside or outside of the hull.

BILGE KEEL.— One of a pair of miniature keels placed on the bilge of a hull. In a steel ship it is a fore and aft plate riveted to the shell. It serves to resist rolling, making the ship steadier in a rough sea.

BITTS.— Formerly, a pair of posts, now a heavy steel casting with uprights fitted to the weather deck of a vessel for attaching the mooring lines or hawsers, as towing-bitts, mooring bitts.

BLOCK.— A casing or shell having holes through which ropes are passed to change the angle of direction; especially the form called in full, a pulley-block, having one or more grooved wheels or pulleys within the casing or block. A hook or ring is usually added for attachment, and the device is the most common form of making a turn in hoisting ropes or securing increased leverage by means of different sizes of pulleys or sheaves. Compare DEADEYE in this article.

BOBSTAY.— A stay holding the bowsprit down to the stem.

BOOM.— A long, round, heavy spar, pivoted at the lower end, as for hoisting cargo, or holding the foot of a fore and aft sail.

BOSS.— An enlargement or curved swelling portion of a ship's hull at the point where a propeller shaft passes through.

BOW.— The forward part of a ship, also called the bows.

BRIDGE.— A platform placed athwartship above the weather deck, for the accommodation of the officers who navigate a ship.

BRIG.— A two-masted vessel, square-rigged.

BULKHEAD.— One of various vertical partitions in a ship's hull, either fore and aft or athwartships.

BULWARK.— The raised side of a ship above the weather deck, topped by a rail.

BUNKER.— A compartment low down in the hull for carrying coal or other fuel. In warships the bunkers are usually positioned so as to cover and protect the machinery or magazines.

BUOYANCY.— Ability to float; also the resulting upward pressure of water on a floating body.

CALKING.— Making tight a seam between planks, as by filling with oakum, hence tightening up any joint so as to be water-tight.

CAMBER.— A slight upward bend, especially in a timber lying athwartship; the curvature measured athwartship of deck, also called "round up."

CANT.— Something set at a slope or angle, as the cant frames — sloping ribs where a vessel's body narrows toward the bow or stern.

CAPSTAN.— An upright windlass adapted to heaving in lines.

CARLINE.— Any short fore-and-aft timber for connecting beams, or the like, as a mast carline, abutting against a mast.

CAULKING.— Closing a seam in a vessel with oakum and a chisel.

CENTREBOARD.— A vertical board or plate pivoted to swing in a well extending through a boat's bottom, as a form of drop-keel.

CENTRE LINE.— The fore and aft middle line of a vessel from stem to stern.

CHINSING.— A rough form of caulking.

CHOCK.— Originally, a block as one back of the poops, to

keep the cradle in position; now usually a heavy fitting or casting through which ropes or hawsers may be led.

CLEAT.— A heavy iron fitting attached to the deck, having a fore and aft arm around which a rope may be wound.

CLEW.— The lower corner of a square sail, or the aft lower corner of a fore-and-aft sail. Also a metal fastening or eye worked into the corner, for tying a rope.

COAMING.— The vertical edge of a hatchway or skylight; a low curb to keep out the water.

COFFER DAM.— The space between two bulkheads when placed close together; also a temporary enclosed dam.

CRADLE.— A heavy framework for supporting a vessel, as in dry dock.

CROSSTREES.— Beams placed athwartships at the head of a mast.

CUTWATER.— A sharp-edged projection set in front of a vessel's stem where it cuts the water-line.

DAVITS.— Heavy vertical pillars with the upper ends bent to a curve, between which a boat is supported and swung on deck. The boat is loaded on the deck, and then the davits are turned so that the boat hangs overboard, when it may be lowered to the water.

DEADEYE.— A block with holes through which ropes are run after the manner of a pulley block, but without sheave or pulley.

DEADLIGHT.— A shutter for a cabin window or porthole.

DECK.— The floor of one of the levels of a vessel; also the space between such levels. The upper deck is the weather deck. Other decks are called berth-deck, half-deck, hurricane-deck, main deck, mess deck, orlop deck (just below the berth-deck), poop-deck, spar-deck, turtle-deck (an upper deck curved like a turtle's back), and wing-deck (one hanging over a paddle-box).

DISPLACEMENT.— The total weight of the water displaced by a ship when afloat, equaling the ship's gross weight with its load.

DOUBLE BOTTOM.— A vessel's bottom made in two thicknesses with a space between, leaving compartments which are used for ballast, water-tanks, fuel, oil, etc.

DRAFT.— The depth of water that a vessel draws, measured vertically from the lowest points of the hull to the surface of the water.

DRAG.— The distance which one end of a vessel's keel is above the other end, when she is not on an even keel, so called because this creates resistance or drag in going through the water.

DRY DOCK.— A dock into which a vessel may be floated, and then by removing the water leave the interior dry for repairing.

DUNNAGE.— Heavy pieces of wood or the like used to prevent cargo from rolling or shifting its position.

EVEN KEEL.— Level keel, said of a vessel lying normally level in the water.

FAIR LEAD.— The lead of a rope in a direction that will not permit it to foul or be subject to excessive friction: also a small fitting for changing the direction of a rope without causing too much friction.

FAKE.— A single turn or coil of a line, rope or cable.

FALL.— A hoisting rope depending from a block or tackle.

FENDER.— A shield-like device for hanging on a vessel's hull at the water-line, to receive the shock of contact with a dock, pier, etc.

FORE.— At, near or toward the bow, as fore-deck, fore-hook (a V-brace in a vessel's bow), foreship (the bows), fore-yard (the lowest yard of a foremast).

FORE AND AFT.— Extending or situated longitudinally of a vessel; in line with the keel.

FORECASTLE.— The forward upper part of the hull, or a compartment there; usually the quarters for the crew.

FORWARD.— The locality at, near or toward the bow.

FRAMING.— The framework or stiffening members; the skeleton of a ship.

FREEBOARD.— The part of a vessel's side that is free and clear when she is loaded, measured as the vertical distance from the upper water-tight deck or top of the bulwarks to the load water line.

FUTTOCK.— A foot-hook or curved timber in the frame of a wooden ship, extending from a floor-timber or cross-timber upward.

FUTTOCK-PLATE.— An iron plate on a mast head for holding the dead-eyes of the futtock-shrouds.

FUTTOCK-SHROUDS.— Short shrouds at the junction of a mast with its topmast.

GALLEY.— The place where the cooking is done on a vessel; the kitchen.

GANGWAY.— A passageway or opening in the bulwarks for use in boarding a ship.

GANT-LINE or GIRT-LINE.— A temporary rigging of a rope through a block at the masthead.

GARBOARD STRAKE.— The streak of shell plating next to the keel: also called sand strake.

GARNET.— A tackle or purchase, as the clew-garnet.

GASKET.— A furling line tapered for use on a yard or boom.

GIMBAL.— A support for a compass or other object which it is desired to maintain in level position, often made in pairs, and permitting the object supported to swing level regardless of a ship's rolling or pitching.

GROSS TONNAGE.— Total carrying capacity; technically, a figure obtained by dividing the total volume of the ship in cubic feet, by 100.

GUNWALE.— The side of a ship at the edge of the weather deck; specifically, the upper wale of planking or plating covering the upper end of the framing, just below the bulwarks

HALLIARD OR HALYARD.— A light rope for hoisting a sail, yard, etc.

HATCH.— A large opening through a deck, as for taking in cargo.

HAWSE.— The locality of the hawse-holes in a vessel; also the position of the mooring cables; and the space between a vessel and her anchor. The hawse-hole is a hole in a vessel's side for the passage of a hawser, and when not in use is closed with a hawse-plug. A hawse-pipe is a large fitting attached to the bow through which the anchor chain passes.

HAWSER.— A large rope, 5 to 10 inches in circumference, usually made left-handed with nine strands.

HEAD.— The forward or upper end of a vessel, mast, etc.

HEEL.— The hindermost part of a vessel, keel, mast, etc.

HELM.— The tiller; also, the tiller and rudder mechanism collectively; also the direction in which the tiller is turned, being opposite to the rudder's position.

HOGGING.— Bending strain lengthwise of a ship, tending to allow the bow and stern to settle lower than the section amidships. See SAGGING in this article.

HOLD.— The space below the lowest deck; the main compartment in the lower part of a vessel, for carrying cargo.

HOUNDS.— A pair of projections at a masthead, for supporting the top trestletrees and rigging.

HULL.— The body of a ship or vessel; the framing as covered with planking or plating. The term is sometimes used to include the decks.

INBOARD.— All inside a ship, toward the centre line.

INTERCOSTAL.— A space between the ribs.

JACKSTAFF.— A short flagstaff, as on the bowsprit, for flying the jack.

KEEL.— The main lower, longitudinal member of a vessel's frame, the first part laid on the ways, originally a very heavy beam, now a series of plates riveted together, and extending from stem to stern along the central line of a ship's bottom.

KEELSON.— A beam or stringer, extending over or along a keel; an auxiliary or strengthening keel-piece.

KNIGHTHEADS.— A pair of uprights supporting the bowsprit on either side.

LAUNCHING.— The sliding of a ship or boat from the launching ways on which she is constructed, into the water. Vessels are usually launched stern first, but occasionally sideways. During launching the weight of the hull is borne by the sliding ways, which are attached to the hull and slide with it down the ground ways. Much of the construction of the upper works, decoration, etc., is completed after the ship is floated. The term launch is also applied to ship's boat with sloop-sail or motor; also to a pleasure boat, as a naphtha launch.

LENGTH.— Properly the extreme longitudinal dimension of a vessel: in practice, restricted to "between perpendiculars," the length from the stem to the after perpendicular or stern post, except when expressed as "length over all," when it is measured from the forward end of the stem to the aft of the stern.

LINES.— The shape or contour of a vessel, as shown on the plans. When drawn full size on the floor of a mold loft, the templates may be made directly from them.

LONGITUDINAL.— That which extends fore and aft, especially a vertical member running practically parallel with the centre vertical keel through a double bottom.

METACENTRE.— The centre of gravity of a vessel, vertically in line with the centre of buoyancy where the vessel is upright. The higher it is above the centre of gravity, the more stable is the vessel.

MAGAZINE.— A compartment or storage room on a vessel of war for safe storage of the ammunition.

MARLINE.— A two-stranded cord or small rope for working or winding around large ropes or cables, as in splicing.

MARTINGALE.— A vertical spar under the bowsprit, a dolphin-striker; also a lower stay for a jib-boom.

MAST.— A long stick of timber or steel, placed nearly upright in the centre line of a ship, originally for carrying sails, on steamships serving for a variety of other purposes. Large masts are built up of pieces, and stepped directly on the keelson. It is common to give them a slight rake toward the stern. The principal parts of a mast are named the head (or masthead), hounding (a projection at the head to support trestle trees and rigging), housing (a hollow in a lower mast to receive a top-mast), neck and heel. A military mast is a stout upright structure carrying one or more turrets for firing small guns, and protected observation towers. The United States navy military masts are commonly made of rods arranged in open work, so constructed that they may be shot through and through frequently without falling.

MIDSHIP.— At the middle of a ship's length: also written amidship.

MOORING.— Securing a ship so that she is not only anchored or tied, but unable to swing with the tide or current, called also permanent mooring. In a less restricted sense, securing a ship with two anchors so that she cannot swing much.

MOULD LOFT.— A cargo loft in which the larger parts and framing of a vessel are laid out to full size.

NET TONNAGE.— Actual available tonnage, calculated by making deduction from the gross tonnage to allow for space not available for cargo.

OAKUM.— Hemp fibre for filling seams, especially that obtained by untwisting and breaking up old ropes.

OUTBOARD.— Away from the centre line, toward the side of a ship.

OUTRIGGER.— A long float braced on one side of a canoe to give stability. Also a bracket built out from the side of a boat to hold a rowlock. Also any boom or spar braced outboard for some special purpose.

OVERHANG.— Any portion of the hull or superstructure of a vessel outside a line drawn vertically from the water-line.

PANTING.— The in and out movement of shell-plating under the influence of varying temperature, strains, etc.

PILLAR.— A column or stanchion, as for supporting the deck.

PINTLE.— A fitting or pivoted pin on the rudder, turning on a gudgeon.

POOP.— The after, upper portion of the hull of a vessel where the steering gear is commonly located. The poop deck is a short deck sometimes placed above the aft part of a spar deck.

PORT.— The left hand side of a vessel, when facing forward, opposed to starboard. Also an annular opening in the hull, or a porthole.

PROPELLER.— A device of angular blades, arranged to balance each other and rotate rapidly in the water, driving a vessel on the principle of a screw. It has almost wholly superseded the paddle-wheel because it is mechanically superior.

PUNGY.— A flat-bottomed sailboat, narrow and sharp-bowed, and usually schooner-rigged, employed on the south-eastern United States coast.

PUNT.— A flat-bottomed, square-ended, small fishing or pleasure boat, for use in shallow water, propelled by pushing it along with a pole. Hence the verb, to punt, or push along such a boat. Small barges on English canals that are propelled in the same way also bear the name.

PURCHASE.— A device for giving a leverage or turn with a rope, as a deadeye and rope, or a pulley and tackle. A double purchase is a rope rove through two single blocks and is also called a double whip. A twofold purchase consists of two double blocks, with ropes arranged to pull oppositely and thus balance. A threefold purchase employs two three-sheaved blocks.

QUARTER.— That part of the side of a vessel's stern that is aft of the main chains; also the part of a yard that is outside the slings.

QUARTER DECK.— That portion of the weather deck nearest the stern, between the poop and the mainmast. It is reserved for officers' use.

QUARTER GALLERY.— A balcony built on a vessel's quarter, often containing a washroom.

RAIL.— The balustrade on the upper edge of the bulwark.

RAKE.— Inclination from the perpendicular: applied especially to the degree of backward inclination of a vessel's masts or funnels. A craft is said to be raking when her masts or funnels have a more than ordinary lean away from the upright.

RATLINE.— A small cross-rope between the shrouds equivalent to the "rung" of a ladder.

RIG.— The style of arrangement of the ropes, sails, spars, etc., of a vessel: frequently used in compound words, as ship-rig, yacht-rig, sloop-rig, etc.

RIGGING.— The cordage or wire rope equipment of a vessel. The permanent ropes are called standing rigging and the movable ones running rigging.

RISE.— Increase of elevation; higher position.

RISE OF BOTTOM.— The amount that the flat portion of a ship's bottom is elevated above the horizontal from the keel to the side of the ship.

ROLL.— The motion of a vessel from side to side, causing an alternate raising and lowering of each side of the decks.

RUDDER.— A flat, approximately triangular structure, swinging from an upright hinged support at a vessel's stern so that all or most of the blade is under water. It is surmounted by a tiller fixed horizontally through the head, and is used for steering. The rudder of a large vessel has a complicated steering gear, power operated, and directed from a wheelhouse.

RUDDER POST.— A heavy vertical post at the after end of the stern frame, which supports the rudder.

RUDDER STOP.— A fitting to limit the swing of the rudder.

SAGGING.— A straining of the ship that tends to make the middle portion lower than the bow and stern; opposed to hogging.

SAMSON POST.— A heavy vertical post or stanchion from which a boom may be swung for handling cargo.

SCHOONER.— A two-masted vessel with fore and aft rigged sails.

SCUPPERS.— Holes in a vessel's side for the deck water to run off; hence, a drain from the edge of a deck, discharging overboard.

SEA ANCHOR.— A float, as of broken spars, lashed together and thrown out to windward from a disabled vessel to serve as a drag, that it may ride out a gale.

SHACKLE.— A form of ring for locking a porthole.

SHAFT.— A very heavy, long cylindrical steel forging for connecting the engine with the paddle-wheel or propeller.

SHAFT TUNNEL.— In a modern steamship, an enclosed alley-way containing the shaft, and running fore and aft from the engine-room to the after peak tank.

SHEAVE.— A pulley-wheel as used in a block for turning a rope. The word is primarily used for the grooved wheel, but the entire pulley-block is sometimes called a sheave.

SHEER.— Fore and aft rise of the deck lines giving curvature to the deck.

SHEER PLAN.— A side elevation of a ship's form.

SHEER STRAKE.— The upper strake of the main shell plating, just below the bulwarks.

SHEET.— A sail or piece of sail-cloth. Also one of the lower corner ropes of a sail, used for sheeting or stretching the clews.

SHEET-ANCHOR.— An emergency anchor, usually hung on either side of the waist of a ship.

SHELL PLATING.— The steel plating forming the outer skin of the hull.

SHIP.— A square-rigged sailing vessel, of three of more masts; also, a large steam-driven craft; popularly, any large floating craft.

SHROUDS.— Two or more stout ropes, often of wire, from a masthead to the rim or side of a ship, constituting a part of the standing rigging, and being supplied with ratlines serving as a rope-ladder for ascending and descending. The stay ropes or chains of a topmast or bowsprit are also sometimes termed shrouds. See FUTTOCK-SHROUDS in this article.

SKIDS.— Parallel timbers for protecting the side of a vessel when hoisting in cargo, etc. They are used also as dunnage.

SLING.— A stout rope or chain, for suspending a lower yard or gaff.

SLOOP.— A fore-and-aft rigged vessel with one mast.

SNUBBING-POST.— A post or pile at a pier or wharf, around which a cable can be turned, to check the motion of a vessel in landing.

SPAR.— Any round timber for supporting a sail or sails, as a mast, yard, boom, etc.

SPAR DECK.— The deck on which spars are stored, being the upper deck, and including usually both quarter deck and forecastle.

SPRIT.— A light spar set diagonally upward from a mast to support the outer corner of a fore-and-aft sail, termed a spritsail. By this arrangement a higher sail may be carried than can be swung from the mast direct.

STABILITY.— The tendency of a ship to remain upright, resisting rolling and pitching.

STANCHION.— An upright post or supporting pillar, on a vessel.

STARBOARD.— The right hand side of a vessel when facing forward: opposed to port.

STAY.— A rope used as a tension piece to support or brace a spar.

STEALER.— A strake of shell plating that does not extend all the distance to the bow or stern.

STEM.— A nearly vertical member forming the extreme bow of a ship, formerly a very heavy timber continuation of the keelson, now a stout forging or casting running from the keel to the forecastle deck.

STEMSON.— A curved timber or supporting member back of the stem, resting on the keelson.

STERN.— The after end of a vessel's hull.

STERN FRAME.— A large casting attached to the after end of the keel to form the ship's stern. It holds the rudder post and propeller post, and has an aperture for the propeller shaft.

STERNSON.— A curved timber or supporting member on the sternpost, being practically an upright continuation of the keelson.

STRAKE.—(The word is a corruption of streak). A fore-and-aft course or streak of shell or other plating.

STRINGER.— A fore-and-aft continuous member, for giving greater stiffening.

TACKLE.— A set of ropes, pulley-blocks, hooks, etc., constituting a hoisting equipment, as a yard-tackle.

TAFFRAIL.— A rail around a vessel's stern: formerly spelled tafferel, from the Dutch *tafereel* (table) applied to the upper surface of a high stern.

TANK TOP.— The inner thickness of a ship's double bottom, as considered from the inside.

THOLES.— A pair of pins for keeping an oar in position where it crosses a boat's gunwale.

THRUST-BLOCK.— A heavy bearing for receiving the thrust or pressure of a propeller-shaft.

TIE PLATE.— A single course of plating run fore and aft under the beams of a wooden deck to strengthen the structure.

TILLER.— The arm attached horizontally to a rudder head for operating the rudder.

TRANSOM.— The aftermost transverse frame in a ship.

TRANSVERSE FRAME.— An athwartship member of a ship's framing placed approximately vertical and resembling a rib.

TREND.— Angular direction, as of a cable with the keel-line, or of an anchor-shank where it joins the arms.

TRESTLETREES.— A pair of timbers set at right angles to a lower mast, to support the top members.

TRIM.— Fit position for sailing, on even keel, with ballast, etc., properly adjusted.

TUMBLE HOME.— An inboard sloping of a vessel's side above the line of greatest beam.

UPPER DECK.— The highest complete deck.

VERTICAL KEEL.— A row of plating extending vertically along the centre of a flat plate keel. Also called centre keelson.

WAIST.— The central section of a ship, between the quarter deck and the forecastle.

WARPING.— The shifting of a floating vessel to a new position by means of a cable (often called a warp) attached to a pile.

WATER LINE.— The lowest visible part of a ship's hull when in the water; hence, a line corresponding with such level, as the load water-line, light water-line.

WEATHER DECK.— A deck exposed to the weather having no overhead protection.

WELL.— A compartment or boxed-in space low down in a vessel's hull, as for enclosing a pump, a propeller-shaft or for holding water, etc.

WINCH.— Originally, a windlass, now a small hoisting engine.

YARD.— A spar for carrying sail, set athwartship, and the principal member of a square rig. It is nearly cylindrical, but tapers slightly toward the ends. When set obliquely, it is a lateen yard.

YARD-ARM.— The tip of a yard, of historical interest as the proper place from which to hang a pirate.

SHIPPING SUBSIDIES, in the broader economic sense, any bounty paid by a government with the object of encouraging the building and navigation of merchant ships. Under this definition would be included, and rightly so, the postal «subventions» paid by many governments for regular mail service between home and foreign ports, for the largest effect of such service is the development and maintenance of a merchant marine.

Subsidies to shipping have been classified as direct and indirect: the first where money is paid to the shipowners; the second where they are favored in other ways. Direct subsidies have been granted by various nations and at various times upon five different basic plans, as follows: (1) on the number of days of actual sailing in the year; (2) on the year's mileage; (3) on the tonnage of the vessels engaged in the trade; (4) on the tonnage as modified by speed; (5) on a scale in which tonnage, speed and the amount of cargo actually carried in the year are controlling factors. Indirect subsidies are of great variety, including government loans at low interest to shipbuilders; free registry; bounties to certain industries which produce export goods; remission or reimbursement of canal and port dues; restriction of coastal trade to domestic shipping, etc.

Most of the maritime nations have adopted the principle of shipping subsidies. France has given the most money, but without the increase in her merchant marine that such expenditure might be expected to induce. At the beginning of the European War, Japan was paying out in subsidies annually about $7,000,000; and Japan's merchant fleet has grown and prospered exceedingly, but so many other factors are to be considered that it is an open question whether the system of subsidies is to be given the credit. On the other hand, Great Britain has built up by far the largest of all national merchant marines without subsidies. The methods employed by the several countries in recent years in fostering their merchant fleets are arranged below in alphabetical order.

Austria.—Trade bounties; depreciation bounties; naval bounties; exemption from trade and income taxes; mail subventions; reimbursements of Suez Canal dues.

Belgium.— Before the war subsidies were granted to German steamship lines to prevent them from forsaking the port of Antwerp. In June 1916 the government entered into agreement with the Royal Belgium Lloyd under which it guarantees interest on loans and mortgages to the extent of 100,000,000 francs in aid of the establishment of a Belgian merchant marine independent of all foreign influence.

Denmark grants an annual subsidy to one steamship company operating a line to British ports. There is a reimbursement to shipbuilders of 2 per cent of the duties collected on materials actually used in domestic shipyards. Postal subventions are small.

France.— Construction bounties per gross registered ton, and in case of the installation of new machinery, an allowance based on the weight of the new work, navigation bounties to steamships not above 3,000 tons and having a speed not less than 10 knots, and to sailing vessels; postal subventions to colonial lines, based on regular service carried on by vessels of stated speed. The French government has recently voted a fund of 160,000,000 francs for loans to shipbuilders to aid in rebuilding the ships lost in the war.

Germany.— Yearly, mileage and speed subsidies to ships built of German materials in German shipyards, and special subsidies to lines running to North and South American ports and to East Africa. Indirect aid was given by preferential rates on government-owned railways and through the control of emigration, which was turned to the German lines.

Great Britain.— No direct subsidies; moderate mail subventions are granted to lines operating under postal contracts.

Holland.— Lower rates of duty assessed on imports brought in on Dutch ships; annual postal and colonial subventions.

Italy.— For years it has refunded to steamers the sums paid for Suez and Corinth Canal dues and has paid bounties on all coal brought from beyond Gibraltar; a mileage subsidy to Italian-owned vessels operating in the Mediterranean and beyond Suez. Besides the regular postal subventions, a speed bounty is paid to all ships of 16 knots or above. Since 1914 shipbuilding materials have been on the free list and a bonus has been granted to shipbuilders. Recent laws exempt Italian subjects from tax for three years on steel vessels purchased and for four years on those built in Italy. Brazil contributes an annual subsidy to Italian lines touching her ports, with the object of encouraging Italian immigration to the coffee districts.

Japan.— Reserves coasting trade to Japanese ships operated by Japanese companies; shipbuilding bounties and navigation bounties; special subsidies to speedy vessels to Pacific Coast ports and to South American ports and to a line using the Panama Canal with a New York terminus.

Norway.— Reimbursement of import duties paid on foreign materials actually used in Norwegian shipyards for building or repair; subsidies to Norwegian steamship companies maintaining service on non-paying routes; subsidies to vessels in the coasting trade; mail subventions; tonnage refund on vessels built in Norwegian yards of Norwegian materials.

Russia.— Reservation of coasting trade to Russian vessels; loans to steamship companies; exemption from customs charges to ocean-going vessels owned by Russians; bounties on ocean liners and inland river steamers; reimbursement of Suez Canal dues.

Spain.— Navigation bounties to Spanish ships manned by Spanish crews, based on actual mileage per ton gross; construction subsidies per gross registered ton, with an additional 10 per cent for each knot of speed above 14; postal subventions; a levy of one-third the bounty in case a Spanish vessel was sold abroad.

Sweden.— Refund of duties paid on construction and repair material used in Swedish shipyards; loans to steamship companies at low rates of interest; mail subventions. A new policy under discussion providing direct subsidies (1918).

United States.— Coasting trade reserved to American ships; heavy mail subventions. The government program as to ships built during the war and subsequently in government yards is laid down in the Merchant Marine Act of 5 June 1920 the chief provisions of which are given below in this article.

In the United States the first act authorizing postal subventions was that of 3 March 1845. Power was given to the Postmaster-General to make contracts for payments of specified rates on weight of mail carried to foreign ports — 24 cents per half ounce for ports 3,000 miles distant; 10 cents per half ounce to Mexico and the West Indies. In 1847 a contract was made with the Ocean Steam Navigation Company for a mail service between New York and Bremen and Havre. The company was to receive $100,000 for six return voyages to Bremen per year and $75,000 for six voyages to Havre. In 1850 the Collins Line, plying to Liverpool, agreed to accept $19,250 per voyage, making 20 voyages a year. A number of similar contracts were made about the same time, but in 1858 the granting of mail subventions was abandoned and vessels carrying the mails were allowed only the sea postage plus the inland postage on mails carried. Postal subventions were allowed to lines running between New York and Rio de Janeiro and between the Pacific Coast and China, but were discontinued in 1875 after running 10 years. In 1891 a law was enacted authorizing the Postmaster-General to make contracts with American shipowners for carrying the mails between American and foreign ports. Steamships were placed in four classes: iron and steel vessels of not less than 8,000 tons with a speed of 20 knots per hour; iron and steel vessels of not less than 5,000 tons, with a speed of 16 knots; iron and steel ships of not less than 2,500 tons and a speed of 14 knots; iron steel and wooden ships of not less than 1,500 tons and a speed of 12 knots. This law is still in force, so far as it does not conflict with the Act of 1920. The requirement is that contracts be let to the lowest bidder who is qualified to perform them.

In spite of the persistent agitation of the shipping interests a general objection to all ship subsidies has prevailed in this country. In 1905 the total tonnage of the United States engaged in foreign trade was only 943,750 as contrasted with 2,496,894 tons in 1861. In 1920 the tonnage as a result of the war had increased to 12,406,000 tons. Since 1840 the United Kingdom has granted liberal subventions for carrying the mails, while in America no action was taken until 1891. The Merchant Marine Act of 5 June 1920 recognizes in part the principle of subsidies. It removed limitations on the rates of mail subsidies, leaving their final determination in the hands of the United States Shipping Board and the Postmaster General within the limits, however, of their respective appropriations by Congress. The Shipping Board may use, out of its revenues, $25,000,000 a year, for five years, as loans at interest to American steamship builders, advancing not more than two-thirds of the cost of construction. A section provides also that the net income, for 10 years of American-owned ships in foreign trade, is exempt from the income tax provided the owner invests the sum of his war-profits and excess-profits taxes in building new ships.

SHIPPING OF THE WORLD. When the Great War broke out in 1914, the world's shipping had reached its greatest known proportions. The year 1913 had been a record year in shipbuilding with nearly all the maritime nations. Great Britain had launched 641 steamers aggregating 1,919,578 tons and 47 sailing vessels aggregating 12,575 tons, the highest figure ever recorded for a year's output of tonnage in that country. Not all of this tonnage went to swell the numbers of the British fleet. Holland bought 89,992 tons; Norway, 54,111 tons; Greece, 39,999 tons; the British colonies, 37,118 tons, and Russia, 31,217 tons. With the exception of the United States, whose output of shipping for the year fell short of her 1912 figures by some 8,000 tons (due to a decrease of 42,000 tons in the yards of the Great Lakes), and slight decreases from previous record figures in France and Japan, all the other shipbuilding countries made substantial gains over their previous records. During 1913, then, the new ships launched had added 3,188,578 tons in steamers and 144,304 tons in sailing vessels to the world's grand fleet. The previous high record had been 2,919,763 tons (steam and sail combined) in 1906, and the average yearly addition to the world's fleet for 20 years past had been 2,341,500 tons. However, the yearly additions were not all clear gain. The losses in 1913 from collision, burning, foundering, wrecks, missing and abandonment at sea, together with those of vessels broken up as unseaworthy, amounted to 499,000 tons of steam vessels and 183,000 tons of sailing vessels, so that the net addition to the world's shipping in 1913 was 2,690,000 tons of steamers, and there was a net loss of 39,000 tons of sailing craft. This figure was very small by comparison with the losses of other years. In 1910 the tonnage lost amounted to 947,690 tons, and the average annual loss for 20 years had been 765,000 tons.

For a long period of years the tendency in the world's grand fleet has been an increase of steam vessels and a decrease of sailing vessels. The one exception has been Finland, whose

persistent building of sailing ships has prevented any notable decrease in the sailing tonnage in Russia's shipping. Norway's sailing tonnage has been declining since 1890; Sweden's since 1880; Denmark's since 1880; Germany's since 1880; Holland's since 1860; France's since 1860; Italy's since 1870; Austria-Hungary's since 1870; Greece's since 1870. In the case of the United Kingdom the date was 1870 and for the United States 1861. Not to go farther back than 1900, the percentage of sailing vessels in the world's grand fleet was 23 per cent; in 1915 it had been fallen to 7 per cent.

The world's shipping on 30 June 1914, as recorded by the French Bureau Veritas, totaled 17,135 steamers of 100 tons or over, aggregating 23,840,675 net tons; and 21,924 sailing vessels of 50 tons and upward, aggregating 5,629,942 net tons: a grand total of 29,470,637 net tons — also recorded as 45,273,783 gross tons, a figure also of no small importance, as the sinkings by submarines are reported on the basis of the gross tonnage; the net tonnage being the vital figure in the carrying capacity of the grand fleet.

Table A, showing the distribution of 99.7 per cent of the world's grand fleet, was compiled from the records of the Bureau Veritas. The 26 countries named are arranged in the order of their steam tonnage. Only steam vessels of 100 net tons and over and only the sailing vessels of 50 net tons and upward have been counted. Many highly interesting facts appear from the figures in the table, among them the very large tonnage in sailing vessels, both actual and comparative, owned in the United States in the year cited. Though Great Britain shows a much larger number of such craft, their tonnage averages only 190 tons as against 420 tons for the United States vessels. Norway's sailing fleet is notable in showing the largest average tonnage in the table — 750 tons; Belgium following with 730 tons and Peru third on that score, with 540 tons. The largest average tonnage for steam vessels is shown by Germany — 1,880 tons; followed by Austria-Hungary, 1,800 tons; Netherlands, 1,740 tons, and Great Britain, 1,640 tons.

With the breaking out of the war in July 1914 the destruction by war vessels of the merchant fleets of the belligerents began, and this destruction on the part of Germany and her allies was soon extended to include the shipping of neutrals carrying contraband, few attempts being made to capture them. In February 1917 the German government declared promiscuous war on all merchant vessels of whatever country found in certain specified areas of the open sea. This condition had already prevailed in some waters for several months previous to the declaration, and many vessels were sunk outside of the forbidden areas, and even those bearing safe conduct from Germany and in the so-called "safe" channels met the same fate. The records of losses from these causes stop with April 1917, at which time the British government ceased the publication of tonnage lost, and gave thenceforth only the number of vessels lost from week to week. A carefully worked-out summary of the losses by mine and submarine from 8 Aug. 1914 to 26 April 1917 shows a total of close to 5,740,000 tons, of which 1,653,654 tons belonged to neutral nations. Of the neutrals, Norway had suffered the most, losing 436 vessels, aggregating 987,816 tons; Holland came next, with a loss of 76 vessels of 148,921 tons. Greece lost 60 ships aggregating 147,923 tons, and Denmark 114 ships, aggregating 123,385 tons.

Table B is introduced to show by the latest complete figures available the condition of the world's shipping at the date given, as it is compiled from records of the Bureau Veritas. The showing is that after three years of the most destructive warfare the world has ever seen, the world's grand fleet consisted of 17,135 steamers aggregating 25,550,159 net tons, and 19,985 sailing vessels aggregating 4,731,707 tons. At their face these figures seem to show the same number of steamers and a gain of 1,710-484 tons of steam tonnage; and a loss of 1,939 in the number of sailing vessels, with a loss of 898,235 tons of sailing tonnage. This is not quite in accordance with the facts. Many of the sailing vessels apparently lost have been fitted with steam or gasoline engines and have thus passed into the class of "steamers." In taking account of the world's tonnage it is to be remembered that under normal conditions the yearly addition to the grand fleet would have been the average previously quoted — 2,-341,500 tons per year. In three years the total addition would have been 7,024,500 tons, instead of the showing for 30 June 1917 of a net gain of 812,249 tons — revealing a net loss due to the war of 6,212,251 tons; a figure not very far removed from the actual losses recorded up to 26 April of that year.

A studious comparison of the two tables shows losses in steam tonnage by Germany, Sweden, Austria-Hungary, Spain, Greece, Belgium, Brazil, Argentine Republic, China, Chile, Turkey, Cuba, Uruguay, Mexico and Peru; and gains by Great Britain, United States, Norway, Japan, France, Italy, Netherlands, Russia, Denmark, Portugal and Rumania. With the exception of Germany, Austria-Hungary and Turkey, whose losses represent vessels seized by belligerents, or, in the case of Turkey, by destruction in warfare, the apparent losses do not show destruction but indicate sales of shipping to the principal allies fighting against the Central Powers. The large reduction of the sailing tonnage of the United States is accounted for by the installation of power, placing them in the steamer class. Another very large factor to be considered in making comparisons is that the allied nations opposing the Central Powers withdrew from their merchant fleets a prodigious amount of tonnage for military purposes, and this does not appear in the columns of these tables. Of Germany's and Austria-Hungary's ships in foreign ports many were seized, at a loss to them of not less than 1,000,000 tons. The United States alone took over 636,036 tons. Figures issued by the United States Shipping Board in March 1919 place the world's steam tonnage at 37,010,000 gross tons; the net loss due to the war at 4,245,000 gross tons — which includes 1,000,000 tons as "abandoned"; and the further loss of the increase to have been normally expected, at 12,000,000 tons: making the world shortage attributable to the war, 16,245,-000 tons on the date cited.

When the armistice was signed 11 Nov. 1918 the United States had a merchant marine of 1,366 steamers aggregating 4,685,263 gross tons, and 747 sailing vessels aggregating 829,-919 gross tons; a combined total of 5,515,182 gross tons, as compared with 2,696,763 tons in 1914 — a gain of over 125 per cent. From such figures as are available Table C has been compiled showing the losses, replacements, and existing merchant tonnage in June 1920 of the principal maritime countries of the world. See MERCHANT MARINE OF THE UNITED STATES.

TABLE A.— SHIPPING OF PRINCIPAL NATIONS, 30 JUNE 1914.

	Steam vessels		Sailing vessels	
	Number	Net tonnage	Number	Net tonnage
Great Britain	6,594	10,785,503	4,945	935,467
Germany	1,510	2,852,797	1,041	426,919
United States	1,103	1,481,849	2,993	1,214,974
Norway	1,266	1,108,504	861	600,714
France	692	1,013,847	877	434,289
Japan	803	953,117	1,308	167,119
Italy	537	786,234	934	279,366
Netherlands	451	782,663	419	48,069
Sweden	940	641,347	1,117	162,289
Austria-Hungary	345	615,554	127	11,538
Russia	622	543,475	3,412	559,914
Spain	438	510,000	249	30,897
Greece	342	448,857	808	142,585
Denmark	470	429,337	615	78,514
Belgium	132	203,311	16	11,639
Brazil	257	174,295	303	67,791
Argentine Republic	147	98,571	175	52,277
Turkey	96	67,637	985	208,751
China	66	65,045	2	439
Chile	66	60,694	82	47,954
Portugal	61	51,531	252	42,413
Cuba	41	34,969	113	11,095
Uruguay	30	26,247	56	24,632
Rumania	22	26,194	22	3,567
Mexico	30	22,095	47	8,512
Peru	12	17,370	58	31,390

TABLE B.— SHIPPING OF PRINCIPAL NATIONS, 30 JUNE 1917.

	Steam vessels		Sailing vessels	
	Number	Net tonnage	Number	Net tonnage
Great Britain	6,673	11,921,245	4,975	731,019
Germany	1,074	2,133,040	1,103	365,232
United States	1,309	2,053,284	1,851	930,814
Norway	1,427	1,363,358	734	494,224
Japan	932	1,140,767	1,493	191,867
France	681	1,028,655	775	386,828
Italy	598	1,025,071	949	243,235
Netherlands	475	898,783	448	49,513
Russia	653	607,211	3,554	583,659
Sweden	826	617,362	901	138,891
Spain	421	489,147	234	29,328
Austria-Hungary	282	486,835	91	7,084
Denmark	483	461,920	634	88,280
Greece	321	430,193	585	106,997
Portugal	128	192,860	217	46,379
Brazil	240	158,745	79	13,292
Belgium	102	153,791	6	7,350
Argentine Republic	135	91,109	49	16,256
China	70	60,824	7	865
Chile	65	54,438	32	24,695
Rumania	29	43,233	3	551
Turkey	69	41,346	963	199,867
Mexico	24	20,048	16	2,483
Cuba	27	17,460	143	14,533
Peru	11	14,681	40	20,254
Uruguay	19	11,651	48	23,163

TABLE C.— WAR LOSSES, REPLACEMENTS AND MERCHANT TONNAGE OF THE WORLD, 30 JUNE 1920. (LLOYD'S REGISTER 1920-21).

COUNTRIES	Losses (tons)	Replacements (tons)	1920 tonnage
Great Britain	7,743,746	4,900,000	20,582,652
United States	383,987	4,100,000	16,049,289
Germany	2,706,000	950,000	672,671
Japan	127,470	885,000	2,995,878
Netherlands	199,975	560,000	1,793,396
Norway	1,178,335	775,000	2,219,388
France	907,168	425,000	3,245,194
Italy	854,124	375,000	2,242,393
Spain	167,693	250,000	997,030
Sweden	201,733	70,000	1,072,925
Austria-Hungary	390,000	75,000	.....
Denmark	239,922	95,000	803,411
Russia and Finland	183,852	25,000	701,236
Brazil	25,464	240,000	497,860
Chile	10,000	320,000	103,788
Greece	337,545	.....	530,261
Portugal	92,382	230,000	275,265
Argentina	4,275	64,000	150,023
Belgium	166,000	.....	415,112
China	15,000	40,000	142,834
Cuba	10,000	30,000	53,439
Mexico	5,000	37,000	.....
Uruguay	6,889	40,000	63,837
Peru	1,419	43,000	88,962
Turkey	60,000	.....	.....
Rumania	3,688	.....	74,549

RICHARD FERRIS.

SHIPS, Registration of. See MARITIME LAW.

SHIPS THAT PASS IN THE NIGHT, the title of a widely-read story by Beatrice Harraden. It achieved notoriety when it was published in 1894 to some extent, very possibly on account of its taking title. The scene is laid in a Swiss winter resort for consumptives.

SHIPTON, ship'tŏn, Mother, an English prophetess about whose existence there seems to be no certainty, while there is no doubt that many of the sayings attributed to her were fabricated by others. According to S. Baker, who published Mother Shipton's pretended prophecies in 1797, she was born near Knaresborough, Yorkshire, in July 1488, and baptized as Ursula Southiel. She died, according to the same authority, at over 70 years of age, but it was not until 1641 that a pamphlet appeared containing some of her alleged predictions. In 1645 all her prophecies were considered as having been fulfilled. In 1862 a prediction was made, with Mother Shipton's name appended to it, that the world would come to an end in 1881. It caused some excitement among the ignorant.

SHIPWORM. See TEREDO.

SHIPWRECKS. See DISASTERS OF THE WORLD, NOTABLE.

SHIR ALI KHAN, shēr ä'lē khän, Amir of Afghanistan: b. about 1825; d. Mazar-i-Sherif, 21 Feb. 1879. He was the younger son by a favorite wife of Dost Mohammed and was nominated successor to the throne to the exclusion of Mohammed Afzal Khan, the eldest son by another wife. Dost Mohammed died in 1863 and a fratricidal war ensued to determine the succession. In December 1863 Shir Ali secured the recognition of the British government to his succession, and in the contest that followed Mohammed Afzal was taken prisoner. The brother and son of the latter, who retained possession of Afghan-Turkestan, renewed the war and in a battle which took place in May

1866 the majority of Shir Ali's troops deserted to the enemy. For the next three years Shir Ali's fortunes ebbed and flowed and at times he seemed likely to lose his throne forever. In 1869, however, with the recognition of the British he was fully established on the throne at Kabul. In 1877 he became estranged from the British government, and refused to receive a British mission at Kabul. At the same time he made overtures to Russia and received her mission, while relations between Russia and Great Britain were strained. The British mission being a second time repulsed, war was declared and the British invaded Afghanistan. Shir Ali fled at the approach of the British and determined upon making personal appeal at Petrograd for an alliance against the British. The Russian government sent him messages declining to enter into any such alliance, but he persisted in his journey until he had crossed the Russian frontier, where he died suddenly. See AFGHANISTAN.

SHIRAS, shī'ras, **George, Jr.,** American jurist: b. Pittsburgh, Pa., 26 Jan. 1832. He was graduated from Yale in 1853 and from the Yale Law School the next year. Received the degree of LL.D. from Yale in 1883. Admitted to the bar in his native city in 1856 he practised there until in July 1892 he was appointed associate justice of the United States Supreme Court. Retired 1 March 1903 on age limit.

SHIRÂZ, shē'rāz, Persia, capital of the province of Fars, lies in a high valley, 220 miles southwest of Ispahan, and is reached by lofty passes. It lies in a broad plain, 115 miles east-northeast of Bushire and 35 miles southwest of the ancient Persepolis, the ruins of which still exist. Its nearest point is Kodijan. It is much praised in Persian poetry for its climate, its wine and rose-gardens. The city, with thousands of the inhabitants, was nearly destroyed for the third time in its history in 1853 by earthquake. The town now rebuilt contains mosques, a bazar, but nothing noteworthy; the suburbs are more attractive. At the north are the tombs of the celebrated poets Hafiz and Sadi, both natives of the town. It is a centre of trade, due to its position on the commercial routes leading from the port of Bushire. Shirâz is famous for its wines and inlaid work of wood and metals. It has extensive manufactures of silk and cotton, firearms, cutlery, glass, pottery, swords, etc. Pop. 40,000.

SHIRÉ, shē'rā, East Africa, a river in the southeastern part of the continent. It rises in Lake Nyassa, and, after a course of 370 miles, flows into the Zambesi. It is navigable except where interrupted for 35 miles by the Murchison cataract and rapids, which have a fall of 1,200 feet. It flows through a rich agricultural country and has become an important commercial route to the lakes region. The Shiré Highlands are included in Nyasaland. There are several Scotch and English missions and settlements in the Shiré country. Cotton and grain are the chief products. The Shiré was discovered by Livingstone (1858–63), and the district was annexed as British territory in 1889. Consult Buchanan, J., 'The Shiré Highlands' (1885).

SHIRE, shēr or shīr, in the United States the more modern term county replaces this older name. Shire is an English term, still in general use in England, Wales and Scotland, although superseded by the modern form in most places; thus Derbyshire, Glamorganshire and Renfrewshire are «counties.» In the United States counties are the first division of the State and township the next. The use of the word shire in the States has no significance as to division; it is merely a portion of a name. Thus we have the «county of Yorkshire.» But in England this is different. The suffix «shire» so used is in itself an indication that the division is a county.

There have been stated different periods at which, it is said, England was divided into shires. It is probable that all such statements are incorrect, and that although there exists in England a system of subdivisions known as shires, the country perhaps never was consciously so divided. If it be remembered that the Saxon people were a collection of clans and that these clans were divided into families, two or three large families to the clan, the seeming inconsistency of the above statement is explained. The head of the family was the supreme law-giver in the family. He himself was under the leadership of the head of the clan, or tribal community. These tribal communities united to form what is known as hundreds, and the hundreds united to form shires. Thus the country instead of being divided into shires was formed by the union of many separate shires, each of which was, practically, an independent kingdom. Some of these small districts still exist — Norhamshire in Northumberland and Richmondshire in Yorkshire. It was after this union of shires under one national head, not a spontaneous process, but one of slow and at times retrogradal growth, that the shire took its position as a subordinate part of the kingdom. As such it had at its head the shire-reeves, whence the modern sheriff. The shire-reeve preceding the Norman Conquest was one of the two heads of the shire organizations, the other being the ealdorman (or earl), whence comes our modern alderman. The ealdorman seemed to represent the old organization and dignity of the shire when it was an independent kingdom; he shared certain offices with the bishop. But the shire-reeve was more particularly the representative of the king, and after the Norman Conquest he became purely a royal officer, with his importance considerably curtailed. He held the sheriff's tourn, an annual court to which came the vassals of the king. The appeal from this court was to the king himself, and from this appeal came the growth of the King's Court, in its three branches of King's Bench, Common Pleas and Exchequer. This court assessed taxes, also, and thus the sheriff became the financial head of the shire; to the Sheriff's Court, too, fell the election of knights of the shire, thus giving it the function of an assembly for the choice of shire representatives. From the time of the Plantagenet accession to the throne the importance of the shire organization decreased, the sheriff now being merely an aid to the County Court (q.v.). (See COUNTY; FEUDAL SYSTEM). Consult J. R. Green's 'History of the English People,' Vol. I (1870–82); 'Conquest of England' (1884); 'The Making of England' (1885); Freeman's 'Norman Conquest,' Vol. I, chs. ii–iv (1870).

SHIRLAW, shēr'lâ, **Walter,** American painter: b. Paisley, Scotland, 6 Aug. 1838; d. Madrid, 1909. He was brought to the United States in his second year, and began his artistic career in early manhood as a bank-note engraver. He exhibited for the first time in the National Academy of Design in 1861. After a course of seven years' study in Munich (1870–78) he adopted genre-painting as his specialty, and also accomplished a great deal of work in decoration and book and magazine illustration. He was one of the founders and the first president of the Society of American Artists, and in 1888 he became a National Academician. A memorial exhibition of 200 of his works was held in New York and other cities in 1911.

SHIRLEY, shēr'lī, **James,** English dramatist: b. London, 18 Sept. 1596; d. there, 29 Oct. 1666. He was educated at Oxford and Cambridge, and, having taken holy orders, obtained a curacy near Saint Albans. He soon afterward went over to the Church of Rome. Then he removed to London, became a writer for the stage and acquired a reputation which caused him to be taken into the service of Queen Henrietta Maria. His first comedy was licensed in 1625, and from that date he produced many plays in rapid succession. In 1636 he went to Ireland to assist Ogilby in the management of the new theatre at Dublin. After his return, probably early in 1640, he wrote much, and was conceded the foremost of English playwrights. He died of exposure during the great fire. He was last of the notable series of Elizabethan and Jacobean playwrights; and his works, while frequently thin in plot and loosely constructed, are clever, suave and abounding in fancy. Besides 37 tragedies and comedies, he published a volume of poems. His best dramas are the tragedies 'The Traitor,' 'The Royal Master' and 'The Cardinal,' and the comedies 'Hyde Park,' 'The Ball,' 'The Gamester' and 'The Imposture.' The best edition of his dramatic works is that by Gifford and Dyce (1833). Consult Wood, 'Athenæ Oxonienses,' (ed. Bliss; 1817); Ward, 'History of English Dramatic Literature' (1875); Forsythe, R. S., 'Relations of Shirley's Plays to the Elizabethan Drama' (New York 1914); Nason, A. H., 'James Shirley, Dramatist: A Biographical and Critical Study' (New York 1915); Parlin, H. T., 'A Study in Shirley's Comedies of London Life' (University of Texas 1914).

SHIRLEY, William, American colonial governor: b. Preston, Sussex, 1693; d. Roxbury, Mass., 24 March 1771. He studied law and in 1731 came to America, settled in Boston, Mass., and there engaged in that profession. He was royal governor of Massachusetts in 1741–45, planned the successful expedition against Cape Breton in 1745, and in 1745–53 was in England, after which he returned to Massachusetts as governor. He made a treaty with the Eastern Indians in 1754, explored the Kennebec River, and erected several forts on its banks, and at the outbreak of the French War in 1755 was commander-in-chief of the British forces in North America. He planned the expedition of General Prideaux against Niagara and accompanied it as far as Oswego, but was superseded in his military command and in his governorship in 1756. He was later appointed governor of the Bahamas, a post he resigned in 1770, and then returned to Massachusetts, where he lived in retirement the remainder of his life. He wrote 'Electra,' a tragedy; 'Bertha,' a masque; 'The Siege of Louisburg' (1745); 'Conduct of Gen. William Shirley Briefly Stated' (1758), etc. Consult 'Correspondence of William Shirley' (New York 1912).

SHIRLEY, a novel by Charlotte Brontë, published in 1849. The scene is laid in the Yorkshire country, with which the author had been acquainted from childhood. The heroine, Shirley, was drawn from her own sister Emily. The book is richer in portrayal of character than in striking incident.

SHIRREFF, shir'ĕf, **Emily Anne Eliza,** English pioneer educator of women: b. 3 Nov. 1814; d. London, 20 March 1897. She was a daughter of Rear-Admiral Shirreff and with her sister Maria — afterward Mrs. William Grey — received an excellent education, especially in languages and history. The inadequacy of educational facilities for women impressed the sisters deeply and their first efforts to improve matters lay through the publication of several books of which they were joint authors. These include 'Letters from Spain and Barbary' (1835 or 1836); 'Passion and Principle,' a novel (1841); 'Thoughts on Self-Culture, Addressed to Women' (1850). Miss Shirreff was a staunch supporter of the movement to establish Girton College, and was honorary mistress there in 1870, as well as being a member of the executive committee until her death. With her sister she founded the National Union for Improving the Education of Women of all Classes out of which in 1877 came the college for women now known as the Maria Grey Training College. She was an advocate of the Froebel system, concerning which she wrote several pamphlets. She was also author of 'Intellectual Education and its Influence on the Character and Happiness of Women' (1858).

SHISHAK, shī'shăk, Egyptian king, the Sheshenk I of the monuments, and the first sovereign of the Bubastite or Libyan dynasty. Shishak I rose to the throne from being commander of the powerful Libyan mercenaries; to him Jeroboam fled for protection when he fell under the suspicion of Solomon (1 Kings xi, 40); and in the fifth year of Rehoboam he invaded Judah, whose fenced cities he took one after another until he arrived at Jerusalem which, according to the statements of Josephus, fell without a struggle. (Compare 2 Chron. xiii, 1–10). Shishak pillaged the temple and the king's palace, carrying off the treasures accumulated in the reigns of Solomon and David, and reducing Judah to the position of a tributary kingdom. He ascended the throne of Egypt about 980 B.C. and reigned at least 21 years. On the southern wall of the great temple of Karnak, in Upper Egypt, is a record of the conquests of Shishak and of the countries ruled by him. On this are four rows of prisoners. Each figure has his arms tied behind him, and a rope around his neck, and Shishak, a colossal figure, leads them by a string, meanwhile branishing a weapon. In the lists of his conquests during the expedition in which Judah was subjected to his rule we find the names of cities in both the kingdoms of

Israel and Judah and of several Arabian tribes to the south of Palestine. Among those of the cities which can be recognized in these lists are Rabboth, Taanach, Sunem, Rehob, Hapharaim Adoraim, Mahanaim, Gibeon, Beth-Horon, Kedemoth, Ajalon, Megiddo and Judah Maluk, "the royal city of Judah," or Jerusalem. Shishak appears to have been one of the ablest and most powerful of the Egyptian monarchs. All Egypt was under his sway. Consult Müller, W. M., 'Egyptological Researches' (Washington 1906).

SHITTIM WOOD. See KITTIM.

SHIVAISM, the religion of the Shivaites, or worshippers of Shiva or Siva, an ancient Dravidian divinity of southern India. His proper name was Mahâdêwa, "greater god"; but the title Shiva, "the good," was more generally applied to him by his votaries. While Shiva is the most popular of the Hindu pantheon, his worship more widely obtains in the south than in the north, although his throne is the Himalayas, and he is a destroying god, yet sometimes restoring and fructifying in influence. Thus in the south he is widely honored under the symbol of the phallus or lingam. Although he is a Dravidian god, in the struggle between Brahmanism and Buddhism he was adopted into the Brahmanistic system and identified with the Vedic Rudra, god of storms. Consult Barnett, L. D., 'Antiquities of India' (London 1913); Hopkins, E. W., 'Religions of India' (Boston 1895); Macdonnell, A. A., 'Vedic Mythology' (Strassburg 1898).

SHIVELY, Benjamin Franklin, American lawyer and senator; b. Saint Joseph County, Ind., 20 March 1857; d. 14 March 1916. He was graduated at the University of Michigan in 1886, and engaged in law practice at South Bend, Ind. He served in Congress in 1884–85 and in 1887–93. He was elected to the United States Senate for the term 1909–15 but died before its expiration.

SHOA, shō'ā, Abyssinia, northeast Africa, an important southern province, before 1889 a separate kingdom, with ill-defined boundaries. It consists of a series of plateaus at 3,000 feet above sea-level, traversed by mountain chains, which, in the culminating point, Mount Metatite, near Ankobar, have a height of 10,700 feet. Its east portion, called Effat, has a less elevated and more generally sloping surface, which is highly cultivated, and yields good crops of grain, chiefly wheat and barley. Cotton also is extensively cultivated. The higher plateaus are devoted to pasture. Among indigenous trees is the *Juniperus excelsa,* which in the course of a century attains a height of 160 feet, with a diameter at the base of four to five feet. The exports of the province comprise grain and large quantities of a durable cotton cloth, and to these may be added, as articles of trade, coffee, gold-dust, ivory, gums and spices, ostrich feathers, hides, dye-woods, medicinal plants, etc. The present capital is Adis Abeba, but the chief town is Ankobar. Christianity was introduced as early as the 3d century, and is still professed by a large number of the inhabitants, though in a degenerate form. Pop. estimated at 2,500,000 of whom about 1,000,000 are Christians and the rest chiefly Mohammedans.

SHOALS, Isles of. See ISLES OF SHOALS.

SHOCK, a sudden vital depression of the body usually due to sudden derangement of the functions of the nervous system, and generally accompanied by a dilatation of the blood-vessels of the surface of the body and a marked decrease in blood-pressure. Such a condition may be brought about by both physically or psychically acting causes. A blow, a fall, a hæmorrhage, an operation, sudden fright, an appalling sight, a heartrending cry, sudden financial loss or great and sudden bereavement are among the many causes constantly acting to bring about such a condition. The symptoms of shock vary greatly according to the type of cause and the individuality of the patient. Sometimes the symptoms begin at once; under other circumstances the results may be delayed for a long period. A very severe form of shock is spoken of as surgical shock. This usually results from serious operations which involve nervous structures, take much time, and large quantities of anæsthetic. A condition closely resembling surgical shock may follow the severe hæmorrhage of placenta prævia, ectopic pregnancy, or other form of internal hæmorrhage. (See BLEEDING). Special types of shock develop from the violent action of heavy explosions in war. These affect the central nervous system and were extremely frequent in the Great War of 1914–18. The symptoms of shock are very characteristic. The face usually becomes blanched and pale, the body becomes cold and is covered with clammy perspiration, the hands and feet usually become icy, the brain seems to be in a whirl, and consciousness is lost or much clouded. The pulse is usually quickened; the arteries at the wrist are soft and easily compressed; the breathing is usually rapid and shallow, labored, and at times irregular. The eyes are often sunken and listless, and the temperature of the body is diminished one or two degrees. The most important single factor in pure shock of the type described is the sudden fall in blood-pressure. This is thought to be due to purely nervous causes, the most potent one of which is paralysis of the sympathetic nervous fibres. This causes sudden dilatation of the blood-vessels, loss of tone of the vessel-walls, with loss of blood-pressure; hence the symptoms, and oftentimes the resultant death. The action in the sympathetic nervous system is largely due to the implication of the suprarenal glands, and other glands of internal secretion. Sometimes the symptoms of shock are much less severe. There is temporary faintness, slight pallor and a feeling of nausea, and the attack passes off. Between this slight shock and the shock that results from the pugilist's "solar-plexus" blow, that may bring death, every variety of change may be noted. In severe accidents many patients, while not suffering from physical injury, are often prostrated and develop true railroad shock, or traumatic neurasthenia. (See NEURASTHENIA). Psychical shock may induce neurasthenia; it may be a potent cause of mental disease; or it may even cause death. The influence of shock upon pregnant women is of great importance. Shock in such circumstances may bring about miscarriage, or cause malformations of the fœtus. Mild cases of shock are recovered from without aid. A stage of reaction sets in, the patient becomes warmer, the blood-vessels regain their tone, and equilibrium is restored. More severe attacks require hot-water applications to the extremities, hot tea or coffee by mouth, alcoholic stimulants, or even ergot or adrenalin. Massage and heat, and sometimes rectal injections of plain hot (110°–115° F.) water, or hot salt water (1 teaspoonful of salt to pint of water) are very useful in extreme cases.

SHOCK ABSORBERS. Even when vehicle springs have been carefully selected with due regard to the loads they are to carry, it is difficult to provide against the many variations in loads and speed that necessarily obtain under conditions of actual service. In automobiles especially it is found that a car which rides easily on good roads often proves decidedly uncomfortable on rough roads because the light springs cause the riders to be jostled about at any but the slowest rate of speed. To aid the springs and effect a compromise, shock absorbers have been devised. They are of various designs and are all intended to supplement the action of the vehicle springs. Two general divisions of absorbers may be noted, however, those which receive shocks caused by a sudden deflection of the spring and those which merely check excessive motion of the spring by what may be considered a variety of brake action. A very simple form of absorber is a rubber pad carried by a clip and attached at the centre of the spring, where on the chassis is fixed a bolt or bracket which, upon the sudden deflection of the spring, rests the frame and load upon the rubber buffer or pad. Another form of absorber is the auxiliary spring, usually a spiral, and designed to operate in conjunction with the main springs. Its function is to retard excessive motion of the latter. Absorbers of the brake action type consist usually of a pair of levers hinged together at one end and the other end attached to chassis and spring, respectively. A variety of this form has a cup and cam hinge, with steel springs inserted in the cup and pushing against the cam. Other designs of absorber consist of cylinders filled with oil and fitted with a piston and plunger rod. One member of these cylinder absorbers is of course attached to the frame or chassis while the other is attached to the axle. The piston acts as a check to any rapid movement of the plunger rod.

SHOE. See BOOTS AND SHOES; SHOE INDUSTRY IN THE UNITED STATES.

SHOE-BILLED STORK, or **WHALE-HEAD,** a large stork (*Balæniceps rex*) found on the White Nile. It is brownish-gray with black wings, tail and feet, the head is slightly crested, the bill short, broad and deep, with the tip hooked and mottled dusky and yellow. These birds, also known as "boat-bills," live in flocks in swampy woods and morasses, and feed upon all kinds of small reptiles, frogs, fish, mollusks and carrion. Although they perch upon trees, the nest is on the ground, a slight lining of grass, etc., in a slight hollow. The eggs are white and from 2 to 10 in number.

SHOE INDUSTRY IN THE UNITED STATES. History.— Shoes were brought to America by the first settlers, as part of their equipment. The Indians wore moccasins, and the white men adopted them until Thomas Beard, a shoemaker of Saint Martin's lane, London, came to Massachusetts Bay colony in 1629, bringing a supply of leather as well as a kit of tools, and became the first shoemaker on record in the colonies. As the colonies grew, other shoemakers came, and Johnson, in his 'Wonder Working Providence,' speaks of the shoe trade in 1654 as among the industries "enriching themselves very much." Many early settlers, being jacks of all trades, made their own shoes. Some raised the cattle and tanned the leather, of which their shoes were made. In New England, shoemakers tramped from settlement to settlement, making and mending shoes, and accepting board and lodging as part pay. In the larger towns, shoemakers set up regular shops. The shoemakers "inhabiting and housekeeping in Boston" were authorized to incorporate by the General Court of the Bay colony, and to enforce rules for the good of their trade. However, the Court provided that there should be no unlawful combination "for enhancing the prices of shoes or wages whereby the people suffer." The Court also provided that no butcher should make leather, that no tanner should make shoes and that no shoemaker should tan leather. It forbade the use of false and deceitful mixtures in making leather. Also it forbade the wearing of extravagant styles in footwear by persons of mean estate. Government regulation of the footwear industry during the war 1914–18 was mild compared to the government regulation during colonial times. The shoe industry flourished, as the colonies grew. But it was not strong enough to provide footwear for the soldiers of the Revolution, and Washington's troops left the bloody footprints of their bare feet in the snows of Valley Forge. John Adam Dagyr, a soldier of the Revolution, and a shoemaker, too, imported fine shoes from London and Paris, and studied them until he learned how to make shoes as good. He freely taught his skill to others. The newspapers spoke of him as "The Celebrated Shoemaker of Essex." They advised their readers to buy fine shoes made in America, instead of importing them from London and Paris.

After the Revolution, Congress put a protective tariff on shoes, and the tariff, with varying rates of duty, was kept in force until the present tariff bill, which put shoes on the free list, was adopted. The early 19th century was a golden era in the shoe industry. Shoemakers worked in little shops by their homes. The shops were called "ten footers" because they were 10 feet square. One of them is a permanent exhibit at the Essex Institute in Salem. The shoemakers read as they worked, or talked with visitors. Roger Sherman, a United States senator, who "never said foolish word," got his education by studying from books opened by his side as he made shoes. Henry Wilson, "The Natick Cobbler" who became Vice-President, got his first lessons in debate by discussing topics of the day with visitors at his little shop in Natick, Mass. Often, the minister was a Monday morning visitor at the shoe shop, and the Sunday sermon was discussed. A Bible was kept in many a shop. In large shops, the shoemakers often sang together. In small towns, men farmed in summer and made shoes in winter. Manufacturers of the cities sent cases of shoes in express wagons to the farmer shoemakers.

The kit of shoemakers of hand method days

consisted of a lap stone, a flat face hammer, awls, waxed ends, knives, rub sticks, a piece of sharkskin, used as is sandpaper to-day for buffing leather, and a bottle of blacking and other small equipment. Each shoemaker had his own kit of tools and "seat" on which he worked and kept his tools by his side. Some used their tools and seats for a lifetime. The pay was small and the employment irregular. A dollar a day was high pay. At one period, in Lynn, shoemakers were paid in orders on the union store, exchanging their orders each Saturday for flour, molasses, salt fish and other necessities. The uppers of many shoes were stitched by women who worked at home. "Binding shoes" this was called, and Lucy Larcom pictured it in her poem 'Hannah at the Window Binding Shoes.'

The change from hand to machine methods in shoemaking makes a marvelous chapter in American industrial history. Thomas Blanchard, a Yankee mechanical genius, was challenged to make a machine to turn gun stocks. He did it. The machine was adapted to making shoe lasts. So it became possible to make thousands of lasts by machinery, where only one could be made by hand. The lasts were refined, and multiplied in style, and standardized in sizes, until there is the thousand and one varieties of to-day. Elias Howe, a struggling young machinist, invented the sewing machine. John Brooks Nichols, a Lynn shoemaker, adapted it to the sewing of uppers of shoes. Women ceased to "bind shoes" at home, or sew the uppers with needle and thread in hand. The machine does the work, stitching shoes a hundred times faster than could the most skilful "binder" and doing it better, too.

Lyman Blake, a South Abington, Mass., shoemaker, invented the McKay machine for sewing soles of shoes just before the Civil War. He worked on it nights, after doing a day's work in the factory. He realized that he didn't have the business ability to put his machine on the market. So he sold it for $70,000 to Col. Gordon McKay. When Blake asked Congress for an extension of his patents, he estimated that his machine had saved to the shoe trade $13,979,724.30.

This McKay machine revolutionized the shoe industry. The shoemakers who worked by hand in little shops at home could not compete against the machine. Factories were established and equipped with machinery. Shoemakers came from little shops to work in the factories. Machinery was invented and developed to supplement the McKay machine for sewing soles and for stitching uppers. One by one the hand workers gave place to the machine operators. Sixty different kinds of machines are used in an average factory at present, and one factory has 137 different kinds of machines which it uses in making a single pair of shoes.

Sidney W. Winslow and others consolidated the several important shoe machinery companies into the United Shoe Machinery Company in 1899. It established a system of leasing machinery. Manufacturers pay so much royalty for each pair of shoes made on its chief machines. They buy outright the supplementary machines, which are used in preparing a shoe for the chief machine, such as a welt sewing machine, or to finish the shoe after it is sewed.

The company makes 25,000 machines a year and 21,000,000 parts. It has its machines in 98 per cent of the shoe shops of the country. It has strong branches abroad, in Europe, South America, Australia and even in Asia and Africa. The methods of the company have been the subject of much discussion in the past few years. The government prosecuted it, 12 Dec. 1911, for violation of the Sherman Anti-Trust Law. The charge was maintaining a monopoly of the shoe machinery industry. After various court actions, covering a period of seven years, the United States Supreme Court handed down a verdict that the company did not violate the Sherman law. The verdict says: "It is impossible to believe, and the court below refused to find, that the great business of the United Shoe Machinery Company has been built up by the coercion of its customers, and that its machinery has been installed in most of the large factories of the country by the exercise of power, even that of patents. The installations could have no other incentive than the excellence of the machines and the advantage of their use, the conditions imposed having adequate compensation, and not offensive to the letter and the policy of the law."

There is still pending in the courts a suit against the United Shoe Machinery Company for violation of the Clayton law, which forbids a "tying clause," or clause in leases which require that one machine shall be used in conjunction with another. This suit was brought in October 1915.

Production.— Through the development of machinery and the factory system, the production of shoes has been multiplied, wages increased, conditions of labor elevated and shoes improved. Wages have increased from $5 or $6 a week to $5 or $6 a day, and skilled workers get more. Tuberculosis, a sickness common among shoemakers who sat on their benches and stooped over their work, is no more an affliction common among shoemakers. People generally get better looking, better fitting and better wearing shoes than ever they had before.

In the shoe manufacturing industry, there are, according to the United States census for 1919, 1,449 establishments. They make 331,224,628 pairs of shoes annually. The shoes are worth $1,155,041,000. They employ 211,049 persons, and pay them $210,735,000 annually in wages. They use 120,632 horse power for driving their machinery.

New England makes about half of the shoes of the country. The business has grown rapidly in the West in the past generation. Saint Louis claims to rival Boston as the greatest shoe centre of the world. Brocton leads in men's shoes, Lynn in women's shoes and Haverhill in fine slippers. Brooklyn and Philadelphia are noted for their fine shoes. Manchester, N. H., Auburn, Me., Rochester, N. Y., Cincinnati, Ohio, Chicago, Ill., Endicott, N. Y., and Milwaukee, Wis., are among the big shoe-making centres.

The old-time shoemaker, who worked in a little shop, made a case of shoes a week, or 6 pairs. The custom shoemaker made any sort of shoes his customers desired, for men, women or children. The shops of to-day specialize, one making men's shoes only, one making women's shoes only and one making children's only. Specialization is the secret of much of the American progress of the American shoe trade. Some shops carry it so far that they make just one grade of shoes, over just one last.

A small shop of to-day makes from 100 to 500 pairs of shoes daily. A medium-size shop makes from 1,000 to 5,000 pairs daily, a big shop makes from 5,000 to 10,000 pairs. A company with several shops makes from 10,000 to 25,000 pairs, and one great concern is credited with a production of 75,000 pairs of shoes daily. The American people average three pairs of shoes per capita per year, and spend about $1,000,000,000 a year for their footwear. Shoes are distributed in the United States through 50,000 retail stores.

Export.— Development of export trade in boots and shoes followed close upon the development of the American shoe factory system. Exports of shoes amounted to $419,000 in 1870. That was when machines were comparatively new, and machine-equipped shops made only a few shoes. In 1900 exports of shoes amounted to $4,000,000. Then all shops were machine equipped, and were able to produce more shoes than the home markets consumed. Exports to Cuba increased rapidly after the Spanish-American War. Cuba is the best customer that American manufacturers have among foreign nations. Exports to South American countries began to increase after the completion of the Panama Canal. They increased enormously during the World War. For 1916 they amounted to 19,400,000 pairs, worth $42,500,000. Many of these shoes were for the armies of France and Italy. In 1922–23 shoe exports amounted to 6,683,762 pairs (men's, women's and children's) valued at $15,532,540.

Styles.— Styles in footwear have changed much, as people changed their activities. Puritans wore plain, square-toe shoes with buckles. Cavaliers wore great boots. People walked much, until railroads came, and necessarily wore stout footwear. Men of the colonial and early Revolutionary period wore small clothes, long stockings and low shoes with buckles. Jefferson provoked bitter criticism when, as President, he first put on pantaloons and lace shoes. Women had one pair of coarse shoes for week day wear and a pair of fine kid shoes for Sunday best. Farmers wore knee high boots of heavy cowhide leather. A century ago New England manufacturers made many "stogas" or coarse brogans, for the slaves of the South. In pioneer towns it was a not uncommon practice for a thrifty farmer and his family to walk barefooted to town, carrying their shoes in their hands, and stop at the edge of the town to put on their shoes, and then walk in them to church. In grandmothers' time, serge Congress boots were common. They had uppers of cloth, with elastic gorings in the sides. Men wore Congress shoes, too. Children's shoes were crude. In shoemaking families, father's old boots were cut apart and were made over into shoes for the children. As the production of shoes multiplied, and the wealth of the people increased, a greater variety of shoes was produced, and people had at their command work shoes, dress shoes, dancing slippers, comfort shoes, fireside slippers, storm boots, fishing boots, baseball shoes, nurses' shoes and other kinds. Indeed, there is now a special kind of shoe for almost every employment or pastime.

Toward the close of the last century, a fashion of "toothpick toes" came in, for both men and women. These shoes had toes long and slim like a toothpick. The wearing of them cramped the toes, and broke down the arches of the feet, and did other great harm. To correct these faults, ingenious persons began to make arch supporters, toe protectors, corn plasters and other remedial devices. The sale of them runs into millions annually.

As standards of shoes have advanced through improvements in manufacture, there has also been improvement in the methods of taking care of shoes. The business of making shoe blackings is extensive. The business of blacking shoes is larger to-day than was the business of making shoes a century ago. Also, machinery for repairing shoes has been developed, and the modern repair shop established in every neighborhood. Now, according to estimates, 100,000,000 pairs of shoes are repaired annually, and the repairing business totals to $300,000,000 annually.

Rubber.— Rubber footwear is comparatively modern. Early colonists wore snow shoes, or clogs and pattens, the latter being wooden soles which were strapped to the feet, over the regular shoes. The first rubber shoes, which appeared about a century ago, were called "gum shoes." They were made of pure rubber. They froze and cracked in cold weather, and they melted and stuck together in hot weather. It was not until Goodyear discovered his process of vulcanizing rubber that rubber footwear became practicable. The making of rubber footwear flourishes in Massachusetts, Rhode Island and Connecticut. Besides making storm footwear, commonly called "rubbers," the rubber shoe companies produce millions of pairs of sport and street shoes, called "sneakers." Rubber heels are made by the millions and during the last few years, the manufacture and wear of soles of rubber and fibre has increased rapidly.

See Boots and Shoes; Leather, Manufacture and Uses of; Leather and Shoe-Trade Technical Terms.

Fred A. Gannon.

SHOEMAKER, Michael Myers, American author and traveler: b. Covington, Ky., 26 June 1853. He studied at Cornell University and since 1874 has traveled extensively over the greater part of the world, making special anthropological studies. He has published 'Eastward to the Land of the Morning' (1893); 'Kingdom of the White Woman' (1894); 'Sealed Provinces of the Tsar' (1895); 'Quaint Corners of Ancient Empires' (1899); 'Palaces and Prisons of Mary, Queen of Scots' (1901); 'The Great Siberian Railway' (1903); 'Heart of the Orient' (1904); 'Winged Wheels in France' (1906); 'Wanderings in Ireland' and 'Islam Lands' (1910); 'Indian Pages and Pictures' (1912), etc.

SHOGUN, shō-goon, the highest officer in the Japanese government during the continuance of the feudal system. He was originally a purely military official, commander-in-chief of the army and first vassal to the emperor. The office became hereditary, and the Shoguns gradually acquired nearly all the real powers of government, leaving only the

title of royalty to the emperor. The latter resided at Kioto while the Shogun held court at Yedo (Tokio) whence he ruled in the emperor's name as his major-domo. The shogunate was abolished in 1868. See JAPAN, HISTORY.

SHOLOM ALEICHEM. See RABINOWITZ, SOLOMON.

SHONTS, Theodore Perry, American railroad official: b. Crawford County, Pa., 5 May 1856; d. New York, 21 Sept. 1919. He was graduated at Monmouth College in 1876 and for a time practised law, but soon became interested in railroad construction. He was in charge of the construction of part of the Iowa Central Railroad and afterward built and was controlling owner of the Missouri, Iowa and Nebraska Railroad. He also gained control of the Toledo, Saint Louis and Western Railroad. In 1905–07 he was chairman of the Isthmian Canal Commission, to which post he was appointed by President Roosevelt. He was president of the Interborough Metropolitan Railroad of New York 1907–19, and president and director in many important railroad and trust companies.

SHOOTER ISLAND, an island in Newark Bay, separated by a narrow channel from Staten Island, N. Y., one mile east of Elizabeth, N. J. It is chiefly noted for its large shipbuilding plant.

SHOOTING STARS, are small bodies that enter the earth's atmosphere from without and, being intensely heated by impact with the air, are consumed before reaching the ground. They probably vary greatly in size, but it is believed that the vast majority do not exceed a few grains in weight. A few may be seen on any clear night, and the number entering the atmosphere every 24 hours has been estimated by Professor Newton at not less than 15,000,000. Most of them are no brighter than ordinary stars, but some rival the brightest planets in luminosity. They seem to leave shining trails behind them, which are perhaps sometimes due to persistence of vision. But the larger ones, resembling brilliant fireballs, leave trails which sometimes remain visible for many minutes. Besides the true shooting stars there are certain massive, meteoric bodies which sometimes reach the earth's surface; these are called meteorites and will be found described under a separate heading. (See METEORITES).

Shooting stars before encountering the earth are invisible to us, traveling in their own orbits about the sun. The moment they strike the atmosphere their kinetic energy begins to be transformed into heat, and they become visible at an elevation of from 75 to 100 miles, where the air is more rarefied than under the exhausted receiver of an air-pump. This rarefaction of the upper air does not, however, save them from the effects of their impact with the atmospheric molecules. Sir William Thomson (Lord Kelvin) has shown that the effect of the friction of the air upon a particle is the same as if the latter was enveloped in a blowpipe flame having a temperature of many thousands of degrees, and the degree of temperature thus developed does not depend upon the density of the medium, but is as great in rare as in dense air. Under these circumstances small particles may be consumed in a fraction of a second. Even if shooting stars, instead of moving independently about the sun, stood fast in space to be encountered by the earth in its annual flight round the sun, their fate would be similar, for the velocity of the earth in its orbit is nearly 19 miles per second, and Professor Newcomb has pointed out that the rise of temperature produced by the impact of our atmosphere with a meteoroid at rest would be nearly 600,000 degrees! But before such a degree of temperature is actually attained the shooting star, even though composed of the most solid metal, must be burned up or volatilized with an immense evolution of light and heat. This accounts for the visibility, at the height of 50 to 100 miles, of particles whose mass may not exceed a single grain.

The height of a bright shooting star may be ascertained by comparing observations of its apparent track among the stars made simultaneously from two points on the earth's surface, a number of miles apart. Each observer sees it projected in a different direction, and the fixity of the star-marked background of the sky across which it moves affords the means of determining the angle between the lines of sight of the two observers. This gives the parallax, and, the length of the base line between the observers being known, its distance and elevation can thence be calculated. It is probable that all shooting stars are entirely consumed by the time they have descended to within 40 or 50 miles of the earth's surface; it cannot be doubted, however, that after floating in the air for perhaps a very long time in the form of impalpable dust, their material finally settles down and comes to rest upon the earth. But the quantity of this is so minute that it would be hopeless to search for it upon the soil and lands of the earth. Nordenskiold, by melting many tons of polar snows and filtering the water, found a residuum of minute globules of oxide and sulphide of iron, and similar particles have been found by dredging at great depths in the sea. Altogether it is certain that the mass of our earth is being continually increased in this way, but its growth is excessively slow. If we assume that 20,000,000 shooting stars fall daily (probably a reasonable estimate), and that the average weight is one-fourth of an ounce, a simple computation shows that there will be thus added to our earth no less than 50,000 tons in each year. At this rate some 800,000,000 years will be required for the deposition of a layer one inch in thickness over the entire earth's surface. It is an important astronomical consideration that this must diminish the rate of rotation of the earth and thus produce a secular lengthening of the day. The action of the tides also tends to lengthen our fundamental unit of time, while the slow shrinking of the earth shortens it; whether the combined effect of all causes is an actual quickening or a slackening of the earth's rotation we do not know. No method of investigation yet devised has been sufficiently refined to detect any change during historic time.

In addition to the sporadic shooting stars which may be seen on any dark night, darting in various directions across the heavens, these bodies occasionally appear in showers, when the sky seems to be filled with flying sparks of fire all radiating from some fixed point among the constellations. These showers are caused by the earth encountering streams of particles traveling in elliptical orbits about the sun.

Scientific study of the orbits of shooting stars began after the occurrence of the most brilliant meteoric shower on record, that of 13 Nov. 1833. This spectacle, which excited the greatest interest among all beholders and was looked upon with consternation by the ignorant, many of whom thought that the end of the world had come, was witnessed generally throughout North America, which happened to be the part of the earth then facing the meteoric storm. Hundreds of thousands of shooting stars fell in the course of two or three hours. Some observers compared their number to the flakes of a snowstorm, or to the raindrops in a shower. The more observant spectators noticed that all the meteors appeared to radiate from a fixed point in the constellation Leo. Tracing their trails backward it was seen that they came together at that point, like the ribs of an opened umbrella meeting about its central stick. This peculiarity is now known to characterize all showers, although when the number of shooting stars is not very great the ribbed appearance produced by the convergence of their trails around the starting point is not so conspicuous. The common centre from which they appear to radiate is called the radiant point, and the determination of its exact location among the stars is of the first importance in ascertaining the actual path of the particles in space outside the earth. A considerable number of such radiant points are now known, each different swarm whose orbit happens to intersect the orbit of the earth having its own radiant, the position of which depends upon the situation of its orbit with reference to the earth.

The explanation of the radiant point depends simply on the laws of perspective. The particles are traveling in parallel paths in a broad cylindrical column, which may envelop the whole earth. When they become visible by striking the air, the observer, looking in the direction from which they approach, sees those that are coming straight toward him as bright points, which grow rapidly larger and then suddenly disappear when they are consumed. Others which, if they reached the earth, would strike to the right or left, or in front of or behind him, appear to diverge in all directions. The same effect is visible when snowflakes are falling vertically on a calm day. Looking straight upward in the midst of the shower of flakes the observer sees them apparently diverging toward every point of the compass, with the exception of the few that fall straight into his eyes.

Immediately after the great display of 1833 Prof. Denison Olmsted of Yale College announced that what had occurred was an encounter by the earth with a vast swarm of particles moving around the sun. The probability that such an encounter was a recurrent phenomenon suggested itself. It was also observed that there were other, less brilliant, showers at different times of the year, notably the annual display on 10 August, having its radiant point in the constellation Perseus. George Adolf Erman, a German physicist and mathematician, about 1839, clearly showed how the orbits of the swarms causing such showers could be determined, but it was not until Prof. Hubert A. Newton of Yale College took up the inquiry in 1864 that the final solution of the problem was begun. Professor Newton, by a careful discussion of ancient records, demonstrated that ever since the 10th century of our era there had been recurrent showers in the autumn at an average interval of 33¼ years. Sometimes the interval was 34 years and sometimes only 32 years, or less, but the mean was 33¼. Upon this basis a return of the shower was predicted for 1866 or 1867.

There had been a gradual change in the date of the showers, which, beginning with 13 October in the year 902, had become 13 November in 1833, but this could be accounted for by planetary attractions shifting the position of the orbit so that its point of intersection with the orbit of the earth moved forward along the latter about a degree and a half in a century.

It had also been observed that usually there was a considerable display a year before or a year after the principal shower. The evident explanation of this was that, instead of being concentrated at one point on their orbit, the particles were strung along in a column of sufficient length to occupy at least two years in crossing the point of intersection with the path of the earth, so that the latter after meeting them once could complete its annual circuit and arrive again at the crossing place before the whole column had passed.

The question remained, what was the length of the orbit of the shooting-star particles or how long a time did they require to make a single journey round the sun and return to their meeting place with the earth? Professor Newton's computations showed that there were five different orbits, any one of which would be consistent with the observed facts. The test by which the real orbit could be selected from the five possible orbits depended on the perturbing action of the planets, already referred to, and the application of this test would require long and laborious mathematical work.

Before this work had been done a predicted return of the phenomenon occurred, with a notable shower in November 1866, followed by a second display the next year. On neither occasion was the spectacle equal to that of 1833. Prof. John Couch Adams of Cambridge University, England, now took up the work of computing the planetary perturbations, and he showed that the period of 33¼ years must be the true one because it alone satisfied all the conditions of the problem. This period, it will be seen, corresponds exactly with the mean interval between the showers. The orbit is a long ellipse, its inner end being a little nearer the sun than the earth is, its outer end beyond the orbit of Uranus.

The period and orbit of the November shooting stars having thus been determined, their next return, in 1899 or 1900, was eagerly awaited. Before the time arrived, however, astronomers had begun to foresee the probability of a disappointment. Dr. G. Johnstone Stoney and Mr. A. M. Downing had calculated the perturbative effect of Jupiter and Saturn upon the swarm, the action of these planets having been particularly effective after 1867, and had pointed out that the result must have been a swerving inward of the orbit of the swarm, so that it could no longer intersect

the earth's orbit at the old meeting point. The event justified these calculations, for, although a considerable number of shooting stars were seen in 1899 and 1900, there was no such display as would have occurred had the earth plunged through the main stream.

The orbit of the August shooting stars or Perseids was also calculated, and this was found to be a still larger ellipse, extending at its most distant point far beyond the orbit of Neptune. In this case the showers occur annually, every time the earth crosses the orbit. This is due, as Erman showed, to the particles having become spread entirely around their orbit in a closed ring, so that they are continually passing the point of intersection with the orbit of the earth. A few of the November shooting stars are seen nearly every year, showing that some of them also have been scattered along the entire circuit of the orbit, although the greater number, in this case, are still collected in a swarm, confined to a relatively small part, one-tenth or one-fifteenth, of the entire length of the orbit.

The next step was the discovery of an intimate relationship between shooting stars and comets. In 1867 Giovanni Schiaparelli of Milan showed that the August swarm travels in the same path as that of a bright comet known as Tuttle's, which was discovered in 1862. Shortly after this announcement, and while it was still under discussion, Leverrier published a revised orbit of the November, or Leonid, swarm and almost simultaneously Oppolzer published an orbit of Tempel's comet, which had appeared in 1866. Examination showed that these two orbits were practically identical, thus seconding Schiaparelli's conclusion with regard to the August shooting stars by furnishing proof that the November swarms also traveled in a comet's track. In 1872 there came a third discovery of the same nature. A comet known as Biela's, which had split in two in 1846, failed to return when due in 1872, but on the night of 27 November of that year, when the earth was passing close to the orbit of the missing comet, a new and brilliant shower, with its radiant point in Andromeda, made its appearance. This was seen again in 1885 and 1892. The orbit coincides with that of the lost comet of Biela. The interval between the displays is seven years, but owing to planetary perturbation the date of appearance in 1892 had fallen back from 27 November to 23 November. They were not seen in 1899.

About a hundred shooting-star swarms have now been recognized, most of them furnishing very inconspicuous displays, and at least half a dozen of these have been shown to travel in the paths of comets. In the table below are given the elements of the orbits of the three greatest swarms known to be connected with comets, compared with the elements of the orbits of the comets concerned.

Following is a list of the principal showers with the positions of their radiant points and the dates of their maximum displays. The names are derived from the constellations in which the radiants are situated:

PRINCIPAL SHOOTING-STAR SHOWERS.

NAME	Radiant		Maximum	Motion and train
	Right ascension	Declension		
Quadrantids	15 H., 19 M.	N. 53°	Jan. 2	Swift; long paths.
Lyrids	17 59	N. 33°	April 20	Swift.
Eta Aquarids	22 30	S. 2°	May 2	Swift; streaks.
Delta Aquarids	22 38	S. 11°	July 28	Slow; long.
Perseids	3 4	N. 57°	Aug. 10	Swift; streaks.
Orionids	6 8	N. 15°	Oct. 19	Swift; streaks.
Leonids	10 0	N. 23°	Nov. 15	Swift; streaks.
Andromids	1 41	N. 43°	Nov. 19	Very slow; trains.
Geminids	7 12	N. 33°	Dec. 12	Swift; short.

These showers occur annually and some of them continue for several nights in succession, the position of the radiant slowly shifting in the meantime with the change in the direction of the earth's motion in its orbit. The Perseids last for no less than five weeks.

Some have supposed that all known swarms are composed of the scattered débris of comets which have been broken up by the tide-producing action of the sun, but this is not yet certain. The amount of disintegration suffered by a comet depends upon the number of its trips round the sun, so that the longer it has revolved in an orbit having a short perihelion distance the more widely its particles may be scattered along its track. Since the Leonids still form a somewhat compact swarm, while the Perseids are scattered in a complete ring, it has been assumed that the former are later comers in the solar system (or at least later comers into the near neighborhood of the sun) than the Perseids. Leverrier tried to fix the date of their first appearance by showing that Tempel's comet, with which the Leonids are related, must have suffered perturbations from a near approach to the planet Uranus in the year 126 A.D., which may have changed its orbit from a very large ellipse, having a perihelion point almost as distant as the orbit of Jupiter, to a smaller ellipse corresponding with the present path pursued by the comet and the particles of the November swarm.

ELEMENTS OF ORBITS OF THREE GREATEST SHOOTING-STAR SWARMS.

ELEMENTS	Perseids	Tuttle's Comet	Leonids	Tempel's Comet	Andromids	Biela's Comet
Longitude of node	138° 16′	137° 27′	231° 28′	231° 26′	246° 0′	246° 0′
Inclination of orbit	64° 3′	66° 25′	16° 46′	17° 18′	12° 0′	12° 33′
Longitude of perihelion	343° 38′	344° 41′	57° 33′	60° 28′	110° 7′	109° 25′
Perihelion distance	0.9643	0.9626	0.9047	0.9054	0.8472	0.8606
Direction of motion	retrograde	retrograde	retrograde	retrograde	direct	direct

ERIC DOOLITTLE,
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SHORE, Jane, mistress of Edward IV: b. London; d. there, 1527. She was remarkable for her beauty and cultivated mind. Her influence with Edward was never exercised but for the benefit of others. (See EDWARD IV). Richard III, partly to revive among the citizens the memory of the licentiousness of his brother, whom he accused of being "the chief abettor of that witch Shore," determined to expose her to public ignominy by accusing her of witchcraft. He was unable to effect his purpose but directed her to be tried for adultery by the Spiritual Court, which condemned her to do public penance in a white shift at Saint Paul's. She was reduced to poverty, and appears to have died in 1526 or 1527. Her story appears in literature in Shakespeare's 'Richard III'; in a tragedy 'Jane Shore,' by Rowe, in many old English ballads, and it has been introduced upon the French stage.

SHORE-BIRDS, the sportsman's name for that large group of limicoline birds, as plover, sandpipers, curlew, phalarope, oyster-catcher, etc. (qq.v.), which are to be found along the beaches of the sea or other large bodies of water, where they seek their food at the edge of the waves. Shore-bird shooting is an amusement of the autumn and early spring, when these birds are migrating between the South and the far northern breeding-places to which most of them resort in summer, and is usually carried on by the aid of stationary decoys, and calls for skill and patience. Consult Coues, E., 'Birds of the Northwest' (Washington 1874); Elliott, D. G., 'North American Shore Birds' (New York 1898); Job, H. K., 'Among the Water Fowl' (New York 1902); Seebohm, 'Geographical Distribution of the Family Charadriidæ' (London 1887).

SHORE-LARK, a small bird (*Otocoris alpestris*), a native of the north of America, Europe and Asia. Within the United States it is found in winter as far south as North Carolina and Illinois. The adult male is about seven inches long; in summer, lores, cheeks, gorget and band on top of head, ending in erectile tufts, black; nape, mantle and upper tail coverts pinkish-brown, white beneath. The eastern or typical shore-lark breeds along the northern border of the United States and in British America. In winter it migrates southward in flocks, which frequent open fields and the seaside meadows. In the western and interior parts of the United States numerous distinct varieties occur, some of which breed in the mountains within our borders. They range as far south as Texas and Mexico. The shore-larks are closely related to the famous skylark of Europe. They nest in a depression in the ground and lay four or five eggs — French white, mottled with dull olive-green or yellowish-brown, but very variable. Nesting begins very early in the spring and several broods may be raised.

SHORE LINE, the dividing line between land and water in rivers, lakes or oceans. Shore lines are continually being modified by wave work, especially on the larger bodies of water. Waves strike blows averaging several hundred pounds per square foot and, armed with sand and gravel, are powerful agents of erosion. They undermine cliffs and carve out sea caves. In many places, especially along the chalk cliffs of England and France, where the rocks are soft, coasts are worn back at an average rate of several feet a year. The island of Heligoland, which in the year 800 A.D. had a circumference of 120 miles, to-day has a circumference of only three miles, and would probably be worn completely away, were it not for artificial protection.

The material thus worn away builds beaches. Where the débris is coarse, bowlder or shingle beaches result; where finer, sand beaches are formed. Much sand is drifted parallel to the coast line by shore or littoral currents (q.v), and where it drifts past some bend in the coast, the beach is prolonged into a spit extending past the bend out into deep water. Due to the constant action of waves and tides the ends of spits are often curved into hooks, as at Sandy Hook. If a spit or hook grows out so that it connects an island to the mainland, a tied-island results. On low, flat, gently sloping coasts, the waves break some distance from shore. At this point sand is heaped up by the action of waves and undertow, and an offshore or barrier beach is formed. Between it and the mainland is a lagoon or salt marsh, which gradually fills with decaying vegetation and wash from the land, and here peat (q.v.) beds are often formed. Off the mouths of large rivers, deltas (q.v.) are built extensive mud flats or tidal flats occur.

Shore lines are profoundly modified by changes of level. Because the ocean bottom is smooth, the uplift forms long straight coasts, known as coasts of emergence. Along such coasts abandoned beaches and wave-cut cliffs may be seen well above water-level, testifying to recent uplift. Such beaches are numerous on the coast of California. When lakes are drained or dry up, such abandoned beaches are also common, as around the old shore line of Great Salt Lake (q.v.). On the other hand, when a coast sinks, or is drowned or submerged as it is usually called, the sea enters the river valleys, forming long, narrow and often branching bays, like Chesapeake Bay. The tops of former hills may become offshore islands, as has happened at many points along the coast of Maine. Drowned shores afford the best har-

bors. The famous Inside Passage to Alaska is the result of deep drowning of a very mountainous coast. See OCEAN; LAKE; and the sections on OCEANS, LAKES and DIASTROPHISM in the article on GEOLOGY.

SHOREDITCH, England, a metropolitan and Parliamentary borough of London, directly north of the city. Area, 658 acres. The district is an extremely poor and crowded one, in which cabinet-making and chain-making are among the principal industries. The borough returns two members to the House of Commons. Pop. about 111,390. Consult Ellis, 'History and Antiquities of the Parish of St. Leonard Shoreditch and Liberty of Norton Folgate' (1798).

SHOREY, shō'rĭ, **Paul**, American educator: b. Davenport, Iowa, 3 Aug. 1857. He was graduated from Harvard University in 1878, and was admitted to the Chicago bar in 1880. He was professor of Greek at Bryn Mawr College 1885–92, resigning in the latter year to fill a similar chair at the University of Chicago. He was professor in the American School of Classical Studies at Athens 1901–02, and was appointed by Columbia University Roosevelt professor in the University of Berlin 1913–14. He was managing editor of, and a contributor to, *Classical Philology* from 1908. He published 'De Platonis Idearum Doctrina' (1884); 'The Idea of Good in Plato's Republic' (1895); 'The Odes and Epodes of Horace' (1898; revised ed. with Laing, 1910).

SHORT BALLOT. See BALLOT.

SHORT-CIRCUIT. See ELECTRICAL TERMS.

SHORT-EARED OWL, a small, nearly cosmopolitan owl (*Asio accipitrinus*), so called because its ear-tufts are inconspicuous as compared with those of its relative, the long-eared owl (*A. wilsonianus*). It is buffy, whitish, striped with dark brown, and 15 inches in total length. Its habits are those of ordinary owls (q.v.).

SHORT LOAN AND COMMERCIAL BILLS. See BANKS AND BANKING — INTERNATIONAL BANKING.

SHORTER, Clement King, English editor: b. London, 19 July 1857. He was in the Civil Service from 1877 to 1890, when he began editorial work and became editor of the *Illustrated London News* from 1891 to 1900; founded *The Sketch* (1893) for the same company and edited it for seven years; also during the same period editing the *English Illustrated Magazine*. After 1900 he became editor of *The Sphere*. Outside his editorial work his Brontë studies are notable contributions to English literature and include 'Charlotte Brontë and her Circle' (1896); Charlotte Brontë and her Sisters' (1905); 'The Brontës: Life and Letters' (2 vols., 1907); among his other works are 'Sixty Years of Victorian Literature' (1897); 'Immortal Memories' (1907); 'Napoleon in his own Defence' (1910); 'George Borrow and his Circle' (1913), etc.

SHORTER CATECHISM, a catechism extensively used by English-speaking Presbyterians throughout the world, and which was framed during the time of the English Commonwealth. A committee of assembly was appointed 5 Aug. 1847 to prepare the Shorter Catechism, which was presented to the English Parliament 26 November, that year, and was ordered to be printed by vote of Parliament, 16 April 1648. The Scotch general assembly adopted the catechism 16 July 1648, and the Scotch Parliament the following February ratified this action. See CATHECHISM.

SHORTHAND has often been defined as the art of writing as fast as a man speaks. The Standard Dictionary definition is better: Shorthand — any system of handwriting that reduces the number of muscular movements required to present words and sentences in graphic outline . . . opposed to longhand. The former definition applies with accuracy only to the most highly developed phase of shorthand — verbatim reporting — applies with much less force to the enormously larger field of business office stenography and ignores the largest and most important potential field of shorthand — shorthand for general personal (non-professional) use.

Four Principal Characteristics.—The shortness of shorthand as compared with longhand is due to four principal factors:

1. Shorthand writes by sound, ignoring the eccentricities of common spelling. This feature alone would, even though each letter of shorthand averaged as long as the letters of longhand, save 15 per cent of time and effort directly, by eliminating superfluous letters, and still more indirectly, by eliminating the mental hesitation involved in following the inconsistencies of common spelling.

2. Shorthand uses for its basic alphabet the simplest signs which its inventor can devise or adapt —seldom averaging more than 1.1 strokes per letter, as compared with about four strokes per letter for longhand as usually analyzed. This feature alone does not, as might first appear, save as much as 75 per cent of the labor of writing, for the letters of longhand are so devised as to join with each other in any order with no appreciable modification of form, direction or position relative to the line of writing — a condition conducive to the highest speed of automatic action and impossible to duplicate fully in any shorthand.

3. Shorthand, by various devices such as the position of strokes relative to the line of writing or to each other, or modifications of length or shading, or initial or final circles, hooks or loops, known as appendages, gives to a single stroke a multiple significance, so that in Pitmanic shorthand, for example, the sign ↘ expresses or implies by logically related rules every one of the six consonants of the word *sprints* in their proper order.

4. Shorthand abbreviates words or phrases much as in longhand, expressing or implying only so many of the sounds as will serve to identify the words written. This is carried to a high degree requiring careful memorization in certain forms for common words, known as wordsigns, and is sometimes carried still further by arbitrary or exceptional use of dots or ticks for particular words, such outlines being known as arbitraries.

Number of Systems.— In the absence of fixed standards of measurement or clear determination of fundamental principles (see SHORTHAND, SCIENCE OF) more than a thousand different systems of shorthand have been published for English alone — a confusion unparalleled since Babel. Fortunately at least nine-tenths of these are of historic interest only to-day, while the remainder may be grouped in a comparatively few more or less well-defined classes.

Three Distinct Styles.— No intelligent answer can be given to the first question of the layman: "Which is the best system of shorthand?" without recognizing that there are three distinct broadly marked fields of shorthand use which may be designated as reporting, business and personal — related, to be sure, but each with its own peculiar problems.

A reporting style of shorthand must use all practicable shorthand devices to their fullest extent with effective (legible) speed, the paramount consideration, attaining a speed from 150 words per minute up to the highest yet achieved, between 280 and 300 words per minute. Such a style will be used for court reporting, legislative reporting, speeches, conventions and in general all verbatim reporting purposes, where the speaker ignores the reporter. Mastery of a reporting style requires long and arduous professional training extending over a period of several years, and commands rewards proportionate to the effort required. The most competent estimates place the total number of verbatim reporters in the United States under 5,000.

A business style of shorthand must use abbreviating devices to some extent but must maintain positive legibility and reasonable simplicity even at the expense of speed, attaining speeds from 90 to 150 words per minute. Such a style will be used chiefly for business office dictation of correspondence, numerically much the largest field of shorthand to-day. Reasonable mastery of a business style is afforded by the average six months' business school course involving about 300 hours' study. Though the 1910 census shows only about 330,000 professional users of shorthand or typewriting, there are undoubtedly to-day (1919) at least 500,000 stenographers or business style shorthand writers in the United States.

A personal style of shorthand must make phonetic correctness and completeness and simplicity the paramount considerations, attaining speeds from 60 to 100 words per minute. Such a style will be used for personal correspondence, by professional writers or speakers for original composition, for lecture notes, abstracts, memoranda and potentially for all purposes of longhand. No system not particularly designed for such personal style use can be mastered to the point of even 60 words per minute speed in less than 100 hours by the average student. Considering the enormous potential value of shorthand for general personal use — the goal and vision of shorthand inventors for centuries — the number of personal style, non-professional, shorthand writers is pitifully small — a condition for which the futile effort to make business style and reporting style shorthand systems serve this distinctive field is chiefly responsible. Each of these three styles has its own problems and its own field, and in each field at the present time a fundamentally different type of system is most prominent.

Reporting.— In the reporting field to-day Pitmanic shorthand is dominant, despite the most strenuous efforts of competing systems of other types. A recent census of the National Shorthand Reporters' Association indicates that 91 per cent of its membership write some form of Pitmanic shorthand.

Business.— In the business field an entirely different type of system, often miscalled "script" shorthand, of which the principal American representative is Gregg shorthand, has recently achieved a marked predominance. A recent questionnaire sent out by the National Educational Association to over 11,000 schools, and eliciting over 3,000 replies, indicates that 67 per cent of all schools, public or private, teaching shorthand (which in at least 99 per cent of all cases means business style shorthand) are teaching Gregg shorthand.

Personal.— In the personal style field no accurate statistics are possible, largely owing to the lack of true personal style systems The nearest approach to a distinctive and rational personal style system in the past was Lindsley's Takigrafy, which attained considerable prominence during the last one-third of the 19th century, but has to-day largely disappeared. The only system alive to-day particularly designed to meet the exacting but little understood requirements of general personal use, in accord with the science of shorthand, is Personal Shorthand (Dewey), which is still too new to justify further comment at this time.

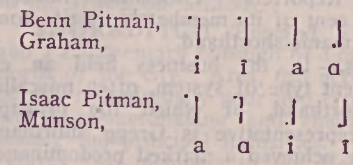
Pitmanic Shorthand Characteristics.— All Pitmanic shorthand is based on the original invention and subsequent modifications of Sir Isaac Pitman (1813–97), justly styled the father of modern shorthand. The distinctive characteristics of all Pitmanic systems include (see also comparative alphabets and specimens following):

(1) Detached vowel-group signs which are distinguished by the position in which they are written relative to the consonant stems. (2) A primary consonant alphabet of 24 stems, of which 21 are alike in all Pitmanic systems, composed of straight lines and circular curves, written on four different slopes and of two thicknesses (shading), but of one uniform length. (3) A secondary consonant alphabet of appendages, circles, hooks and loops, used under various conditions for alternative expression of the more common consonants, supplemented by further devices such as writing consonant stems one-half or double their normal length to imply other additional consonants, or writing outlines above, on or below the normal line of writing to indicate that an omitted vowel is one of a particular group.

Pitmanic Variations.— Of the many variant forms of Pitmanic shorthand which have been published, the Benn Pitman, Graham, Isaac Pitman and Munson are the most important in the United States, ranking in that order of numerical strength. In Great Britain, under more stringent copyright protection, the parent Isaac Pitman system is dominant, but in this country it is altogether secondary to the dominant Benn Pitman and closely related Graham.

The principal differences between the leading Pitmanic systems are: (1) Three conso-

nants, w y h, which are written: Benn Pitman, Graham, Isaac Pitman, Munson. (2) The relative positions of two pair of the dot vowels which are written

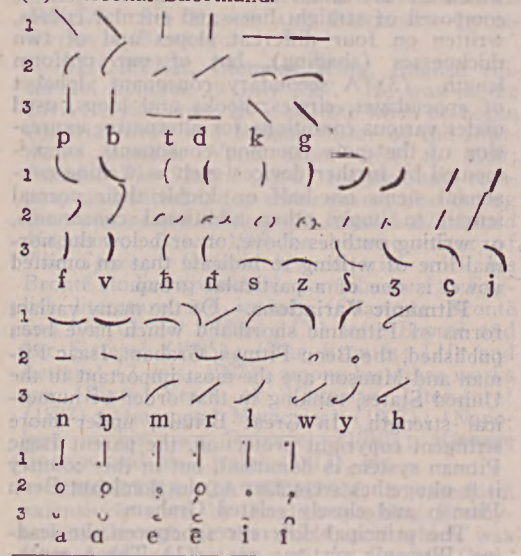


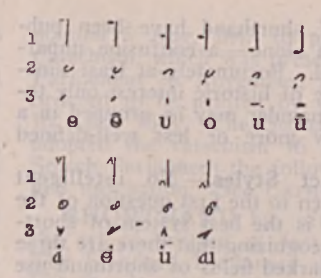
(3) Various minor details, especially with regard to the writing of small and large hooks on consonant stems.

Gregg Shorthand Characteristics.— The distinctive characteristics of Gregg shorthand include: (1) Joined vowel-group signs which are distinguished by detached diacritic marks; (2) A consonant alphabet composed of straight lines and elliptic curves, written on only two slopes and of only one thickness (non-shading); but of three lengths. (3) Conspicuous absence of those compound consonant devices which add complication on the one hand and power on the other in Pitmanic shorthand.

Personal Shorthand Characteristics.—The distinctive characteristics of personal shorthand include: (1) Joined vowel signs explicit without further distinction; (2) a consonant alphabet of straight lines and curves, written on four slopes, of two thicknesses (shading), and of one length; (3) compound consonant signs designed and used primarily for the true consonant compounds of English, especially those which occur before the vowel of their syllable.

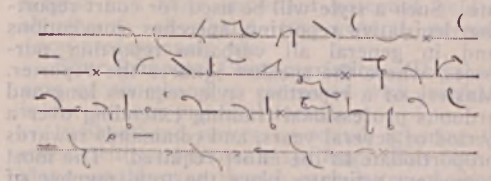
Comparative Alphabets.—The table following gives the basic alphabets of the three systems reviewed as most representative of the three styles of shorthand to be distinguished. The sounds of the shorthand signs are keyed by the N E A alphabet* (see PHONETICS), used as Key 1 of the New Standard Dictionary and its abridgments, the only phonetic key suitable for general popular use in English. (1) Benn Pitman Phonography; (2) Gregg Shorthand; (3) Personal Shorthand.



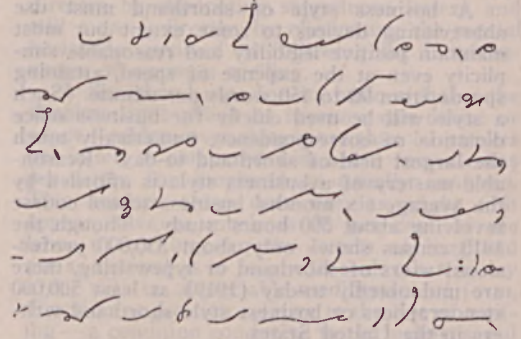


Comparative Specimens.— The specimens following give a familiar selection, the Lord's Prayer (Matt. vi, 9–13), in the reporting style of Benn Pitman Phonography, the business style of Gregg Shorthand, and the personal style of Personal Shorthand.

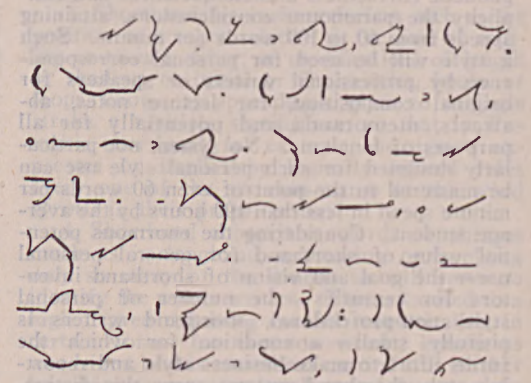
Benn Pitman Phonography reporting style



Gregg Shorthand business style



Personal Shorthand personal style



The best system of shorthand or the best style of a particular system is that style or system which best meets the requirements of the writer. The shortness and complexity of a true reporting style is altogether unsuitable for general personal use. The simplicity and fulness of a true personal style is altogether impossible for reporting practice. The unsuitability of a business style for reporting or personal use differs nowise in kind but only in degree.

GODFREY DEWEY,
New York State Shorthand Reporters' Association.

*The type actually used to key the shorthand alphabets below is a simplification of the N E A alphabet by the author in harmony with shorthand practice.

SHORTHAND, History of. The early history of this art is closely allied with palæography, and it has been traced into the mists of antiquity. Antiquarians have tried to connect it with hieroglyphics and to show that it was used more than 1,000 years before Christ by the Persians, Egyptians and Hebrews. Abbreviated writing, to take down lectures and also for the preservation of poems recited at the Pythean, Nemean and Olympic games, was practised by the early Greeks, and there are specimens of ancient Greek *notæ*, or shorthand, in the Vatican Library, at Rome, the Bibliothèque Nationale, at Paris, and the British Museum.

Ancient History.—The definite existence of shorthand reporting dates in the century preceding the Christian era. Tiro, the accomplished freedman and amanuensis of Cicero, was in 63 B.C. the first known practitioner of the art. He reported speeches of his master, which were afterward revised by the orator; and as *notæ Tironianæ* became the established name for shorthand writing its invention was subsequently ascribed to him. At that period Rome was drawing from Greece her stores of learning and art, and Tiro's system was probably an adaptation from the Greek. Plutarch informs us in his life of Cato the Younger that Cicero distributed notarii (shorthand reporters) in various parts of the Senate House on the occasion of the vote as to the fate of Catiline, the chief purpose being to take down the speeches of Cæsar and Cato. The text of those speeches may be given by Sallust in his history of the Catilinian conspiracy, chapters 51–53, or the historian may have followed the example of Thucydides and embodied in them his conception of the character and policy of the two foremost senators. Mæcenas, the famous statesman, courtier and patron of literature, introduced some improvements in shorthand, and, according to Dion Cassius, instructed many in the art through his freedman Aquila. Seneca afterward increased the number of notations to a total of 5,000. Scalinger made a collection of the notes of Tiro, Seneca and others, which is appended to the great work of Janus Gruterus, published at Heidelberg, in 1603.

An illustrious German scholar, Ulrich, in 1817 analyzed the Tironian notes and his analysis shows that Roman shorthand, though a strain on the memory, answered the practical purposes of stenography quite as well as the systems in vogue in the early part of the 19th century, such, for example, as the one sketched by Charles Dickens from his own experience in the 38th chapter of 'David Copperfield.' We are informed by Suetonius that the Emperor Augustus taught the art to his grandchildren and that the Emperor Titus was a skilful stenographer. Martial, who lived in the time of Nero, has left an epigram upon a shorthand writer: *Currant verba licet, manus est velocior illis.* Among ancient papyri discovered 100 miles south of Cairo in 1903 by Professors Grenfell and Hunt, there is a contract with a writer of tachygraphy, made 137 A.D., whereby a slave boy was to be taught shorthand for 120 drachmæ ($24); 40 drachmæ were to be paid down, 40 more on satisfactory evidence of the progress of the boy and the last 40 when he had become proficient.

Shorthand seems to have been much used by the early Christians. It is supposed that Saint Paul dictated to amanuenses several of his epistles, notably that to the Colossians, where Tychicus acted as shorthand writer and Onesimus as transcriber. We know that Origen in the 3d century was assisted in the preparation of his 'Commentaries on the Scriptures' by clerks who wrote in shorthand from his dictation. Saint Augustine refers to an episcopal assemblage held at Carthage late in the 4th century, at which eight stenographers were employed in relays of two. About the same period the poet Ausonius praised a youth who could write faster than his master could dictate, and, with poetic license, even faster than he could think; and in another poem expressed his admiration of the skill of the stenographers of the time. Charlemagne, king of the Franks for 46 years and likewise Roman emperor during the 14 years preceding his death in 814, possessing an amount of learning unusual in his age, endeavored to become proficient in writing Tironian notes. But the *lingua Latina* was fast giving place to the *lingua Romana*, from which the modern Romanic languages of Europe sprang. At the Council of Rheims in 813, priests were admonished to address the people in the rustic tongue. Nor was a knowledge of the art confined to the Western civilization. A translation by Professor Flügel, of Dresden, from the Arabic, narrates how a Chinese in 923 A.D., who had acquired Arabic speech and writing in less than five months, took down in shorthand from the lips of his teachers 16 books of Galen.

Modern History.— The first modern shorthand work was printed in London in 1588 and dedicated by its author, Dr. Timothy Bright, to Queen Elizabeth. The first French publication, that of Jacques Cossard, appeared in 1651. The oldest German system was published in 1679. Gurney's is the oldest living system of English shorthand. It was first issued by Mason in 1672 and improved by Thomas Gurney in 1750. Taylor's system appeared in 1786, subsequent editions of which bore the name of Odell, Harding and so on. This system has a remarkable history of successful adaptation to Continental languages. Bertin adapted it to the French and Danzar in 1801 adapted it to the German language. Marti's tachygraphy was an adaptation of Taylor's alphabet to the Spanish language and was first published in 1800. By a royal ordinance in 1802 a chair for shorthand was established in the university at Madrid and Marti named as professor. The cortes of Cadiz first had an official shorthand report of its proceedings in 1810. Marti's tachygraphy was in 1828 applied to the Italian language by his son, who also adapted it to the Portuguese. Pereira had also, early in the century, adapted Taylor's alphabet to the Portuguese. The intro-

duction of shorthand into Mexico and the countries of South America followed these adaptations. Amanti, an Italian, adapted Taylor's shorthand to his own language and as modified by Delpino it is now used by the official corps of the Chamber of Deputies. The three prevailing French systems are those of Prevost, Duploye and Prépéan, the first named being a modification of Taylor. It is estimated that the bibliography of shorthand comprises 16,000 volumes, exclusive of reissues or editions. A valuable contribution to the English branch of this subject has been made by Julius Ensign Rockwell, published by the government as Circular of Information No. 2, Bureau of Education, Washington (1884), and Circular No. 1 (1893). The latter contains a reproduction of 112 English shorthand alphabets, extending from the first alphabetic system, that of Willis, in 1602, to the Duployan method adapted by Pernin in 1882. In 1888 'Light Line Phonography,' issued later as 'Gregg Shorthand,' was introduced.

A court of law in England in 1740 took the initial step in appointing an official shorthand writer. The next instance of the public recognition of shorthand in that country occurred in 1789, when the House of Commons, during the trial of Warren Hastings, called the shorthand writer to the bar and required him to read from his notes the exact words used by Mr. Burke, and thereupon resolved that Mr. Burke had exceeded his instructions in accusing Sir Elijah Impey of murder. The publication of Hansard's Debates was begun in 1803 and has become a general system of reports of representative bodies in Great Britain and her colonies. It is compiled from newspaper reports, supplemented by special reports. This system is closely followed in some of the colonies, as in New Zealand, while a method similar to that pursued by our national legislature has been adopted by the Canadian Parliament. The Hansard's report is semi-official, the speeches being submitted to members for revision and it is subsidized by the House of Commons. The official shorthand writing for the British Parliament is confined to the committee reporting, in which Pitman's and Gurney's systems have long had governmental recognition.

A census taken in 1914 of the systems of shorthand used in the Press Gallery of the British Parliament showed that out of 137 writers 128 wrote the Pitman system, 4 the Taylor system, 2 the Gurney system and 3 the Sloan-Duployan system.

The American colonies were not far behind the mother country in the use of shorthand. The Virginia Convention of 1788, called to deliberate on the ratification of the Constitution of the United States, was reported in shorthand in a meritorious manner by David Robertson, of Petersburg, Va., and in 1903 the National Shorthand Reporters' Association of the United States erected a tablet in Saint Augustine's Church, Philadelphia, to the memory of Thomas Lloyd, the official reporter of the National House of Representatives, 1st session 1st Congress. This tablet bears the following inscription:

Captain Thomas Lloyd, Author, Soldier, Patriot.
The father of American shorthand reporting.
14 August 1756 — 19 January 1827.

In 1834 Franz Xavier Gabelsberger, secretary to the Ministry in Bavaria, brought out his invention and in 1837 Isaac Pitman, of Bath, England, gave to the world the first edition of phonography or sound hand. Gabelsberger's system, with adaptation, has been widely introduced in Austra-Hungary, Switzerland, Russia, Denmark, Norway, Sweden, Finland, Poland, Holland, Belgium, Serbia and Rumania, although in some of these countries modifications of the Stolzean method predominate. Wilhelm Stolze published his system in 1841 and it is used in the Prussian Chamber, which is the sole exception to the official use of Gabelsberger's shorthand in Germany. In Russia a translation of Gabelsberger is officially employed in the imperial Senate, the Court of Cassation and other law courts. There was, of course, a gradual development of the art down to Isaac Pitman's invention. Dr. Bright's system was cumbrous and followed the vertical style of Chinese writing; but he indicated a present particle by two final dots just as Isaac Pitman nearly three centuries afterward denoted it by one.

Phonetics.— The phonetic principle was first applied to English shorthand by John Willis, in 1602, and it was further developed from time to time; but it remained for Isaac Pitman to make it a complete basis; in other words, to invent phonography or sound hand. As there are in the English language 43 distinct sounds, represented by 26 letters, Isaac Pitman adopted an extended alphabet by which consonants are indicated by simple geometrical strokes, straight or curved, the light sounds denoted by light strokes and the heavy ones by corresponding heavy strokes. The leading heavy vowels are represented by six heavy dots and a like number of heavy dashes, placed at the beginning, middle or end of the strokes and before or after as they precede or follow the consonants. The same course is followed with the light vowels. Diphthongs are provided for by a combination of dash forms and by a small semicircle differently formed and placed in different positions. Circles, hooks and loops are employed in distinct offices. As an illustration, the word *bought* is composed of three sounds represented by six letters. It is spelled phonetically *b aw t*, and in phonography it is written with two straight strokes joined, one sloping and the other perpendicular and a disjoined dash. In rapid writing the dash is omitted, as an important feature of the art in reporting is the use of consonant outlines, omitting vowels. It follows that shorthand is more readily adapted to a consonantal than a vowel language and for this reason French is easy and Japanese difficult. In every case, however, many brief forms, more or less arbitrary, are used for words of frequent occurrence.

Pitman System.— As has been stated, verbatim reporting in the English-speaking world dates from the invention of phonography by Sir Isaac Pitman. In recognition of his eminent service, the honor of knighthood was conferred on him by Queen Victoria. There was a celebration in London in 1887 known as the Golden Jubilee of Phonography, in which an array of talent was displayed which came as a surprise to men of letters on both sides of the Atlantic, who were unaware of the accomplishments necessary to make the career of a shorthand reporter successful. Sir Isaac died in 1897, after having witnessed the introduction of phonography into every land that Anglo-Saxon civilization has penetrated. The inventor received great aid from his brothers, but that of his youngest brother was conspicuous and American. Benn Pitman came to the United States in 1853 and established in Cincinnati a phonographic institute and a publishing house, which are still in successful operation. For many years Pitman had an able associate in the person of Jerome B. Howard. In 1903 Benn Pitman having spent 50 years in the dissemination and development in the United States of his brother's invention, the National Shorthand Association, which met in Cincinnati, made an appropriate celebration of the golden jubilee of his labors.

The following is the complete alphabet of the Isaac Pitman system as presented in «Course in Isaac Pitman Shortland» (1918).

THE PHONOGRAPHIC ALPHABET.
(BY ISAAC PITMAN.)

CONSONANTS.

EXPLODENTS.		CONTINUANTS.	
P	B	F	V
T	D	*TH*	TH
CH	J	S	Z
K	G	SH	ZH
NASALS. M		N	NG
LIQUIDS. L		R	
COALESCENTS. W		Y	ASPIRATE. H

VOWELS.

LONG.		SHORT.	
1. AH	as in *tah*	ă	as in *pat*
2. EH	,, *tay*	ĕ	,, *pet*
3. EE	,, *tea*	ĭ	,, *pit*
1. AW	,, *taw*	ŏ	,, *not*
2. OH	,, *toe*	ŭ	,, *nut*
3. OO	,, *too*	ŏŏ	,, *foot*

DIPHTHONGS. I OW OI U

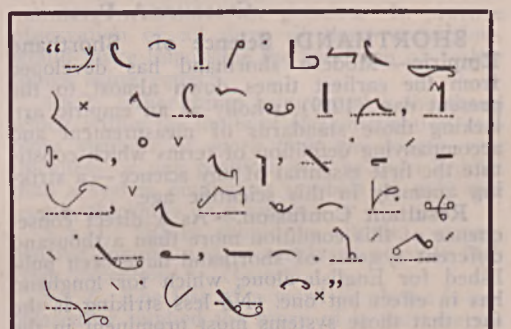
To these brief elementary signs, which represent every distinct elementary sound in English, are added abbreviating adjuncts and principles that enable the hand to keep pace with thought. When Isaac Pitman invented his shorthand alphabet and with the assistance of distinguished educators and practitioners improved it, he had a three-fold object in view:

1. To give those who had memoranda to make, a more elementary method of writing, plain, simple, easily acquired in a few weeks, and capable of being executed at the rate of 50 or 60 words a minute.
2. To develop a style of writing for the use of business men, ministers, physicians, authors, scientific investigators, and others who would acquire through a few months' study the ability to write 100 words per minute, with the ease of speech and the legibility of print.
3. To establish a system of reporting for those who sought to record the eloquent orations of public speakers at the rate of 300 words a minute when required.

How well the inventor succeeded in his realization of these first two resolves may be seen in the representation in the next column and the history of the dissemination of the art proves that this third has also been crowned with success.

Pitman's phonography has not only been successfully adapted to such languages as the Spanish and Dutch, but even to the Malagasy for official used in Madagascar, and in 1902 Edward Gantlett made an adaptation to the Japanese language under the title 'Phonographica Japonica.' In Japan and China a method of tachygraphy is generally employed. The separate marks which united form a character in ordinary writing are made by a single stroke of the pen, the contours being traced regardless of details. In India, Navina, of the Punjab University, invented an alphabet of new Hindu characters, which is said to form the basis of a rapid and legible system of shortland. Other systems, based on Isaac Pitman's, have been introduced in the United States by Elias Longley, Andrew J. Graham and James E. Munson. Mr. Graham brought out the first edition of his 'Standard Phonography' in 1858.

SPECIMEN OF ISAAC PITMAN SHORTHAND.



"I wish every man had such an education—every young man especially. And if either of my sons had lived, and I had trained him, as I should have tried to do, to be a great and good farmer, I should have wanted to send him at least six months to a Business School, to give him the aptitude and habits and forms of a thorough Business Man."

Horace Greeley.

Official Use.— The enlarged use of shorthand, owing to the demands of State legislatures, courts and the business world, is well known. The National Shorthand Reporters' Association has an executive committee composed of reporters from 35 States, 2 Territories and the District of Columbia. (See SHORTHAND STANDARDIZATION). The Senate of the United States in 1848 made a contract for a verbatim report of its debates and proceedings and the same course was adopted by the House of Representatives in the following year. Before 1848 the *Congressional Globe* contained an abstract of the debates and such speeches in full as members wrote or had specially reported. In 1873 Congress adopted the existing method and transferred the official publication of the proceedings from private contract to the government printing office. By this method each house employs a corps of five

reporters, the Senate paying to its corps $25,000 a year and the reporters of the House receiving $5,000 a year each. In addition, the House of Representatives employs a corps of official reporters of committees.

Shorthand has reached the highest possible development in every country where a parliamentary form of government has obtained. Turkey possessed no system of shorthand until her accession to the list of constitutional states, brought about by the reform movement of 1876. The Turkish Parliament met in 1877 and much difficulty was found in securing reports. Stenographers were employed to translate on the spot into French the speeches delivered in Turkish, but in this work the note-takers failed. The speakers were then required to reduce their remarks to writing before delivery; but it was found that such a rule could not be applied to a deliberative body. Efforts were then made to invent a stenographic machine, but this proved a failure there as elsewhere. Gabelsberger's system subsequently was translated into Turkish by Grünbaum.

The Continental countries of Europe, Great Britain and the United States now make instruction in shorthand a material and essential part of education.

CLARENCE A. PITMAN.

SHORTHAND, Science of. Shorthand Empiric.— Modern shorthand has developed from the earliest times down almost to the present day (1919), wholly as an empiric art, lacking those standards of measurement and accompanying definition of terms which constitute the first essential of any science — a striking anomaly in this scientific age.

Resultant Confusion.— As a direct consequence of this condition more than a thousand different systems of shorthand have been published for English alone, which for longhand has in effect but one. No less striking is the fact that those systems most prominent in the United States to-day differ not only in their specific alphabets and outlines and minor rules but also in their most fundamental conceptions of the nature and use of shorthand material — differences as marked as though the steam railroads of the country should run on one rail or three while the electric rapid transit of the cities ran on two.

Controversial Data.— This lack of recognition of scientific principles which, recognized or not, must underlie the practice of any useful art, has developed an immense mass of controversial literature, in which system A is compared with systems B and C, or system X with systems Y and Z, always to the latter's disadvantage — each document conclusive and final in itself, but each directly and irreconcilably contradictory to the other. The inevitable result of this futile recrimination has been to increase rather than decrease confusion and strife, and to make organized scientific progress impossible.

Efforts to Formulate Science.— Various attempts have been made in the past to determine the basic principles which, systematically related, constitute the science of shorthand as distinct from the practice of the art. Of these, the most noteworthy was the formation of The Shorthand Society in London in 1881, with the avowed purpose of "the study of the science and literature of shorthand and the investigation and discussion of the principles which should govern the construction of systems of shorthand and abbreviated longhand, adapted, if possible, for general use." The transactions of this society (50 numbers of the magazine *Shorthand*), which lasted for a dozen years till disrupted by the factional strife of system partisans, contain many sincere efforts to establish such basic general principles of shorthand — unfortunately in most cases too specific in their application to particular types of systems to have the general value for which they strove.

The outstanding feature of the society's efforts is undoubtedly the work of Edwin Guest, 1836-1919) which reached the point of propounding and roughly grouping 49 genuinely single and separate propositions and definitions under the general head of "Shorthand principles worthy of general acceptation," before further organized progress was suspended by the disintegration of the society.

Equally able and sincere though less detailed is the notable paper of Prof. J. D. Everett, "On the principles that govern the construction of a system of shorthand," read before the 1887 International Shorthand Congress at London. Various other statements have been put forth in the name of shorthand science, but with rare and fragmentary exceptions they prove on examination to be at best a list of unsubstantiated personal opinions, at worst a catalogue of personal prejudices.

Science of Shorthand.— The science of shorthand, presented before the 1918 convention of the New York State Shorthand Reporters Association, the oldest shorthand organization of America, as a part of the work of the Committee on Shorthand Standards marks the first systematically comprehensive formulation of the fundamental principles of shorthand science. It is an attempt to classify, define and where necessary discuss the single separate factors involved in the construction of any shorthand system, so far as they could be ascertained by reading, conference or original research; with out regard to their bearing on any particular system past, present or future. Although necessarily neither complete nor final it may be considered substantially correct as far as it goes and sufficiently complete to be accepted as a guide.

Structure.— The propositions of the science are classified under seven heads: 0 General considerations; 1 Phonetic or sounds; 2 Geometric or signs; 2:1 Assignment of signs to sounds; 3 Manual of writing; 4 Visual or reading; 5 Mental or remembering.

Each main head is subdivided into three classes: (a) Axioms and definitions — which should involve no scientific controversy at the present time; (b) Canons — which are considered proven or demonstrable but recognized as still subject to controversy in greater or less degree; (c) Theorems — put forward rather for discussion and investigation than for immediate acceptance.

The direct work of the science has been supplemented by extensive researches giving the relative frequency of every sound and the commoner syllables and words of English, and is being further supplemented by various experimental data on the relative facility of the possible signs and sign combinations of shorthand writing and their relation to penmanship technique. Much more remains to be done, but the work is going forward under the direction of the leading State and national associations.

Limitations.— Students of shorthand science will be struck by the absence from the science of any specific pronouncement on such leading questions of shorthand as: Whether to shade or not to shade stems; Whether to write stems on two, three or four distinct slopes; Whether to use the appendages for primary representation of vowels or for secondary representation of consonants. This is because such questions are not single separate factors of any shorthand problem, but are each a complex of a dozen or more important and inter-related factors, so that to pass judgment on such decisions would easily become dogmatic and enormously restrict the scope and usefulness of the science.

Purpose.— The purpose of the science of shorthand is to provide those standards of measurement and their accompanying definition of terms essential to scientific shorthand progress; to be used analytically to determine the strength or weakness of existing systems, or synthetically to determine the construction of future shorthand systems.

Specific Propositions.— A few of the more important propositions of the science, illustrative of the plan and scope, are given below. The complete series to date (1919) is accessible in the 1918 Proceedings of the New York State Shorthand Reporters Association. The first figure of each number refers to the main head noted above, the letter to the sub-class. The second figure is a serial number in each sub-class, for convenient reference.

0 a 4. No system of shorthand can conceivably be *best* in every important point, for several of the most important basic features are mutually incompatible. "Every fair minded person who has paid any attention to the relative merits of different systems, or who has himself tried his hand at system-making, knows that the best result can only be attained by judicious compromise. One advantage cannot be obtained in its highest degree without the sacrifice of other advantages, and no sound judgment can be arrived at by setting up one particular point of superiority as the sole test of excellence." (Everett).

0 b 8. "Time, not space, is the proper measure of brevity." (Guest).

1 a 1. The total number of different sounds in spoken English can no more be determined than the total number of different colors in the spectrum, and for the same reason — that they blend into one another by imperceptible degrees or shades.

1 a 2. A minimum number of sounds necessary to be distinguished for phonetic writing of English may be and has been conclusively determined. This minimum number is 40, counting diphthongs. (See table of comparative alphabets under SHORTHAND).

2 a 1. The simplest conceivable material for graphic purposes is composed of right lines and arcs of simple curves, whether of circular, elliptic or other assumed origin.

2 a 6. The principal material for modifying or supplementing the simplest straight and curved stems consists of circles, hooks and loops, small and large, initial and final, and, in the case of straight stems particularly, right and left.

2:1 a 2. Latham's second law: "2 That sounds within a determined degree of likeness be represented by signs within a determined degree of likeness; whilst sounds beyond a certain degree of likeness be represented by distinct and different signs, *and that uniformly.*"

2:1 b 1. (Assignment of signs to sounds in a simple shorthand for general use). Must not suggest by geometric similarities phonetic relations contrary to fact.

3 a 2. The relative ease of the various strokes which are possible material for shorthand writing will be profoundly affected by the muscles chosen to perform the principal effort and control of writing, and by the position of holding the pen or pencil. It is therefore essential that instructions for pen position and muscles to be used be adapted to each other, and to the genius of the system to be written; or, conversely, that in the construction of a shorthand system these points be determined in advance of its analysis of other data.

3 a 4. Other things being equal, a shorthand which employs symbols of *only* one length, one thickness or one position, will be more *facile* than a system employing symbols of more than one length, thickness or position. In practice observation of all three of these restrictions would make impossible the condition of "other things being equal."

4 a 2. Other things being equal, a shorthand which, within the limits of clear distinction, employs symbols of *more than* one length, one thickness or one position, will be more *legible* than a system employing symbols of only one length, thickness or position.

5 a 1. "Rules should be simple, comprehensive, logical, and as nearly as possible free from exceptions." (Guest).

5 a 2. The less of a word or phrase is expressed or implied the more of it must be remembered.

5 a 6. Arbitrary abbreviations are always objectionable, but are least objectionable in words of most frequent occurrence; for the double reason that their economy is so much the more valuable, and their meaning so much the more readily remembered.

5 b 2. Words are most readily recognized by their first elements, next by their last elements and least by their middle elements.

Thoughful consideration of these and similar factors, studying their inter-relations and weighing their relative importance for the particular purpose in view, will go far toward assuring a more rational and constructive development and progress for the shorthand of the future.

GODFREY DEWEY,

New York State Shorthand Reporters' Association.

SHORTHAND STANDARDIZATION. In 1909 the National Shorthand Reporters Association appointed a committee "to standardize verbatim shorthand reporting, putting it on a thoroughly scientific basis." This committee, accepting as a starting point those signs and principles common to all Pitmanic shorthand systems, has given 10 years of arduous and unremunerated toil by some of the best reporters of the United States and Canada to

comparison and selection of reporting expedients and word and phrase outlines, in the effort to make of Pitmanic shorthand the most perfect instrument yet devised for the purposes of the verbatim reporter. It is hoped that the results of the committee's labors, now nearing completion along this particular line, may be made available in the near future (1919) by publication under the auspices of the association.

SHORTHORN, a breed of cattle. See Ox.

SHORTHOUSE, Joseph Henry, English manufacturer and author: b. Birmingham, 9 Sept. 1834; d. London, 4 March 1903. After a secondary education at Tottenham, he became a manufacturer of sulphuric acid at Birmingham, but soon found his calling in literature, and privately printed a half-mystical work of fiction, 'John Inglesant.' This was published in 1881, was much talked of and gained a solid success. Other works of his, such as 'The Little Schoolmaster Mark' (1883–84) and 'Sir Percival' (1886), did not encounter a similar acceptance, but are greatly prized by thoughtful readers. Besides his fiction he wrote an essay on 'The Platonism of Wordsworth' (1882). See JOHN INGLESANT.

SHORTIA, a genus of plants of the *Diapensia* family, containing two species, one (*S. uniflora*), in Japan, and the other a very local plant, in the Alleghany Mountains. The latter species (*Shortia galacifolia*), is an interesting plant, historically, being closely associated with Dr. Asa Gray. When in Paris in 1839, Dr. Gray saw an unnamed specimen, with only leaves and fruit, in the herbarium of the elder Michaux, who stated that he had collected it in 1788, in the high mountains of Carolina. Dr. Gray afterward searched for it in that region, but was unsuccessful. He, however, described this plant, "with the habit of pyrola and the foliage of galax," and named it in honor of Dr. C. W. Short. The *Shortia* was afterward found (1877), although not in the locality mentioned by Michaux, but was in flower and was sent to Dr. Gray to verify his classification. In 1886, almost 100 years after it was first seen, and after much laborious searching, the *Shortia* was rediscovered by Dr. Sargent, in practically the identical region visited by Michaux. Later still it was found in such quantities that it was transplanted, and this once unknown flower is now becoming a common plant in horticulture. It has a creeping rootstock, a large tuft of long-petioled, evergreen leaves, with brownish stains, thin and serrate and shaped very like the galax leaves used in floral decorations. There are several flower scapes, some six inches tall, bearing solitary nodding, five-parted, bell-shaped flowers an inch long and wide, with white-fringed petals, blooming in the early spring.

SHORTSIGHTEDNESS. See VISION, DEFECTS OF.

SHORTT, Adam, Canadian political economist: b. of Scottish parentage, near London, Ontario, 24 Nov. 1859. He was educated at the universities of Queen's (Kingston, Ontario), Edinburgh and Glasgow, and on his return to Canada became an assistant in philosophy at Queen's University, and after the establishment of the Macdonald chair of political science at Queen's was appointed to fill it. He became Dominion Civil Service Commissioner in 1908 and was created C.M.A. in 1911. He made a close study of Canadian economic problems as well as of English and French Colonial policies, and published in the *Journal of the Canadian Bankers' Association* a series of papers on the 'History of Canadian Currency' and 'Banking and Exchange.' His other writings include 'Imperial Preferential Trade, from a Canadian Point of View' (1904); 'Report on Railway Taxation for the Ontario Government' (1904); 'Documents Relating to the Constitutional History of Canada, 1759–61' (1907); 'Life of Lord Sydenham' (with A. G. Doughty, in 'Makers of Canada' series, (1908).

SHOSHONE (shō-shō'nē) **FALLS,** a waterfall of the Snake River (q.v.), in the south of Idaho, about 30 miles south of Shoshone. Above the falls proper, the cañon is about 750 feet wide and 1,200 feet deep. The waters are deep and flow with scarcely a ripple until the rapids are reached, when the water spreads out fan-like and drops over numerous precipices, some 50 feet in height, then, as it were, gathers its entire volume and plunges over a precipice 210 feet in height. Below this fall the cañon is about 1,000 feet in depth. Four miles higher up are the Little Shoshone Falls, a broken cataract of 182 feet.

SHOSHONEAN INDIANS (adapted from *Shoshoni,* an important Shoshonean tribe, whose name is probably an opprobrious Siouan epithet), a linguistic stock of American aborigines which formerly occupied a large part of the great interior basin of the United States. On the north, Shoshonean tribes extended far into Oregon, where Shahaptian territory was met. On the northeast the eastern limits of the pristine habitat of the Shoshonean tribes are unknown; the narrative of Lewis and Clark asserts that the Shoshoni bands encountered on Jefferson River, whose summer home was on the headwaters of the Columbia, formerly lived, within their own recollection, in the plains east of the Rocky Mountains, whence they were driven to their mountain retreats by the Minitari (Atsina), who had obtained firearms, and much of whose territory was formerly occupied by Shoshonean tribes. Later a division of the Bannock held the finest portion of southwestern Montana, whence they were apparently being pushed westward across the mountains by Blackfeet. On the east the Tukuarika, or Sheepeaters, held the Yellowstone Park country, while the Washaki occupied southwestern Wyoming. Nearly the entire mountainous part of Colorado was held by the several Ute bands, including the northern drainage of the San Juan in the southeast and extending into northeastern New Mexico. The Comanche division of the stock extended farther eastward than any other, but with the exception of the Penetehka band, this important and warlike tribe did not make its appearance in the southern plains until the beginning of the 18th century, although they later extended their raids throughout the greater part of Texas and far into Mexico. On the south, Shoshonean tribes were limited generally to Colorado River in Arizona and California; the Chemehuevi occupied both banks of that stream above and below Bill Williams Fork, and the Kaibabs, Shivwits and Kwaiantikwokets (Paiute divisions) occupied northwestern Arizona and southwestern Utah. The pueblo-dwelling Hopi or Moki occupied seven villages in northeastern Arizona in the middle of the 16th century, some of which were subsequently abandoned and new ones established, and about the close of the 17th century Tewa Indians of Tanoan stock from the Rio Grande established the pueblo of Hano among the Hopi (see TUSAYAN). In the southwest, Shoshonean tribes had pressed across California, occupying a wide belt of country to the Pacific. In their extension northward they had reached as far as Tulare Lake, from which territory they had apparently dispossessed Mariposan tribes. A little farther northward they had crossed the Sierras and occupied the heads of San Joaquin and Kings rivers; they also occupied nearly the whole of Nevada, and the entire southeastern part of Oregon was likewise inhabited by tribes of Shoshonean extraction.

Owing to the vast extent of country occupied by these tribes, which ranged from timbered mountains to desert plains, with great difference in climatic conditions, their habits and customs greatly varied. The northern and eastern members of the stock — the Bannock, Shoshoni, Ute and Comanche — were hunting Indians, living in tepis and subsisting almost entirely on large game, including the buffalo; but of these tribes only the Comanche were essentially «Buffalo Indians.» Most of the western tribes of the stock, notably the Piute, inhabited in the main an inhospitable desert region which afforded scant subsistence in the way of seeds, berries, roots, fish and small game. The necessity of digging roots for food early earned for them the sobriquet «Diggers,» a name still applied to the Piutes and their relatives in eastern California, western Nevada and western Utah, particularly those not under official control. Living in rude brush shelters or sometimes even in holes in the ground, and subsisting on the meagre natural products of the desert, these Indians have been regarded as, in some respects, among the lowest in the culture scale of the tribes of the United States, although some of the Piute divisions and the Chemehuevi practise agriculture to some extent. The Hopi or Moki, whose country in northeastern Arizona was the province of Tusayan (see TUSAYAN) of the early Spaniards, are much farther advanced than any of the Shoshonean tribes, due probably to a large infusion of eastern Pueblo and other foreign blood; they live in permanent adobe houses, have a highly developed social and religious system, successfully cultivate the sandy soil and have earned just renown as potters, weavers and basket-makers.

Owing to the fact that various Shoshonean tribes have been long in contact with the white races and that they had themselves advanced pretty well along the road to civilization before the system of Indian reservations came into vogue, many of the Shoshoneans have never been placed on reservations, and their modern descendants have so identified themselves with the life of the nation that it is difficult to make clear their tribal relationship. This is especially so of the Piute and the Pueblo dwellers in general. An estimate of Shoshoneans place them at over 21,000, distributed as follows: Bannock 600, Chemehuevi 500, Comanche 1,500, Hopi 2,000, Towa 1,200, Piute 7,000, Shoshoni 3,300, Tobikhar 2,300, Ute 2,600. This estimate does not include very small tribal remnants, numbering about 100 or less. The modern scientific view of the Shoshoneans is to consider them a part of a still larger family which includes the Aztecs and related tribes of Mexico. For a description of the various tribal divisions of the Shoshoneans, see PUEBLO; BANNOCK; COMANCHE; UTE; CLIFF DWELLERS.

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SHOT. See PROJECTILES.

SHOTGUN, a small-arm with smooth bore, used for firing a charge of small shot in hunting wild fowl and small animals. It may have one barrel or two, and is called accordingly single-barreled or double-barreled. Two other types are recognized: the muzzle-loader and the breech-loader. The former type is no longer manufactured, but many such firearms of the olden time are still in existence, and hold their own in accuracy and effectiveness with the most carefully made modern weapons of this class.

The forerunner of the shotgun was the old-time blunderbuss, with its spreading wide-mouthed barrel devised to scatter its handful of miscellaneous missiles over as large an area as possible, with still enough striking force in them to accomplish its purpose. It had a range of about 100 feet. The shotgun of to-day has but little longer range (40 yards) but delivers its charge in a more condensed group and with the expenditure of considerably less powder.

The principal parts of a shotgun are the barrel, the frame and the stock. The necessity of having a barrel sufficiently strong to withstand the force of the powder explosion and at the same time provide a weapon not too great in weight to be comfortably carried about for a day's sport led to an ingenious plan by which the force released might be controlled by the greater lengthwise resistance of the fibres in a rolled bar. Wrought iron and steel strips were laid alternately and twisted together, and then wound in a close spiral around a rod-like mandrel. This spiral was then heated and welded into a solid tube, which was afterward bored out as to the inside and turned, "browned" with acid and polished on the outside, then presenting the peculiar grain which marked the "twist" or "Damascus" barrels so familiar a generation ago. The success of these light tubes in withstanding the sudden bursting pressure to which they were subjected developed another difficulty; the gun was too light to take up a sufficient part of the recoil to render its use agreeable. This fault was happily remedied by adding another barrel, which not only

brought the weapon to an adequate mass, but afforded the huntsman the opportunity of a second shot.

Following the invention of breech-loading mechanism for rifles, this improvement was adapted to the shotgun by the device of «breaking» the barrels on a hinge-joint at the frame, so that the open butt of the barrel was presented for the insertion of the cartridge. The leaking of the gases of explosion, however, called for further improvement, and this was secured by the invention of an expanding shell for the cartridge. The force of the exploding powder automatically expands this shell so snugly into the breech chamber that all leakage of gas is prevented.

The next advance, the hammerless gun, was also the result of an improvement of the cartridge so that a centre pin could be used to explode the charge. The rim-fire cartridge thereupon disappeared and with it the projecting hammers.

Another important improvement of the shotgun had progressed contemporaneously with those already noticed; the introduction of the choke bore. While choke-boring had been invented as early as 1781, it was not definitely adopted until 1866. It consisted in contracting the gun-barrel slightly near the muzzle for the last few inches of its length — in some cases for five to eight inches, in other makes for two or three inches. Some gun manufacturers taper the choke to a conical form; others introduce a shoulder with gently rounding curves a few inches from the mouth; and there are several modifications of these practices. In the straight-barreled or non-choking gun only 30 per cent of the shot in the charge reach a target 30 inches in diameter at a distance of 40 yards. With the choke-bore barrel (other things being equal) 70 per cent of the shot is delivered upon the 30-inch circle. The explanations of this result have been many, but the one generally accepted is that the choke momentarily holds back the wad, and with it the forcibly expanding gases which otherwise have a tendency to scatter the shot laterally just as they leave the muzzle. Gun barrels are made «full-choke» or «modified choke.» In a 12-gauge gun the bore is 0.730 inch; with full-choke the mouth is narrowed to a diameter of 0.695 inch; with modified choke, to 0.716 inch.

The modern gun is of 10, 12 or 16 gauge, double-barreled, breech-loading and hammerless. It may have two triggers, one for each barrel, or but one trigger, a second pull on which fires the second barrel. The pull on the trigger is gauged from three to six pounds, less than three pounds being considered dangerous. The great majority of the American guns of the present day have barrels of forged steel. The bar from which a barrel is to be made is first rough-bored, then rough-turned on the outside and then straightened by hammering. It is then turned again and ground on a broad-faced stone. The lug is then brazed on. The inside of the barrel is then reamed out several times up to the choke, and this is shaped by special reamers according to the pattern desired. The two barrels selected to be associated in the double-barreled gun are tinned along their adjacent sides and blocks of metal are placed between them to keep them at the proper distance apart, the centre lines of the muzzles converging three-sixteenths inch for 30-inch barrels. The ribs are then soldered into the rabbets prepared for them. The stock of the gun is of walnut, Circassian walnut being favored for fine guns. The frame is of steel and serves to connect the barrels to the stock as well as to house the lock mechanism. The gun may also be a repeater, firing several shots in quick succession from a magazine lying under the barrels. A well-made gun of 12-gauge will weigh from five and one-half to seven pounds, depending upon the work expected from it.

Military Shotgun.— The military shotgun used by the American army in the Great War for night expeditions in "No Man's Land" and in clearing up trenches has a barrel 20 inches in length and carries a bayonet. It is of the repeating type, firing six times before reloading. The charge is of nine buckshot, and its shooting qualities are exceptional. Upon a life-sized manikin, at 30 yards all nine of the shot hit the target; at 50 yards the hits ranged from four to eight; at 80 yards, two to four hits; at 100 yards, always one hit and often two.

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SHOTWELL, James Thomson, American historian: b. Strathroy, Ontario, Canada, 6 Aug. 1874. He was graduated at Toronto University in 1898 and took his Ph.D. at the University of Columbia in 1902. He has been connected with the faculty at Columbia since 1900 and since 1907 has been professor of history there. He was assistant general editor of the 'Encyclopedia Britannica' in London in 1904–05. He also edited 'Records of Civilization' (20 vols.). Author of 'Sources and Studies' (3 vols., 1915–16). He was a member of the American mission which accompanied President Wilson to the Peace Conference in Paris in 1919.

SHOULDER-GIRDLE. See SHOULDER-JOINT.

SHOULDER-JOINT, the articulation of the upper arm or humerus with the glenoid cavity of the scapula or shoulder-blade. This joint is an example of the enarthrodial or ball-and-socket joints; the ball-like or rounded head of the humerus working in the shallow cup of the glenoid cavity. The head of the humerus is very large when compared with the glenoid or receiving cavity. The capsule which surrounds and encloses the joint is of very loose nature, but is intimately connected with the muscles which are attached to the head of the humerus. The joint itself is guarded against dislocation or displacement by the strong ligaments surrounding it, as well as by the tendons of its investing and other muscles; while superiorly the acromion and coracoid processes of the scapula form an arch, together with the coraco-acromial ligament, which further serves to protect the joint. The shoulder arch or girdle, also called pectoral arch or girdle, is in vertebrates

— in mammals, none above monotremes (see MONOTRAMATA)— usually attached to the sternum ventrally, and to it the fore limbs are articulated. It has only an indirect connection with the vertebral column. Rudimentary or greatly modified in the majority of mammals, this girdle is especially marked in certain groups of birds (see ORNITHOLOGY). In man the clavicle is completely developed, and with the scapula this forms the bone-structure of the shoulder-girdle, which, relatively, is endowed with superior strength.

The articulating surfaces of the shoulder-joint are covered with cartilage. The capsular ligament forms the chief ligamentous structure. It serves chiefly to support the inner and upper portion of the glenoid ligament, which is fixed around the margin of the cavity of that name. Its function is chiefly that of deepening the cavity by adding to its circumference, and it also protects the bony edge of the cavity. The motions of the shoulder-joint are limited and controlled by the interlocking of the bones, as well as by the tension of the capsule. The biceps muscle, in the relations of its tendons to this joint, subserves several important uses. Primarily, and from its connection with both elbow and shoulder-joints, it brings the movements of both into harmonious relation; while it strengthens the upper portion of the articular cavity and steadies the head of the humerus, through its relation to the bicipital groove of that bone.

This joint is liable to various diseases and injuries. Local injury may result in inflammation, while diseased conditions of constitutional origin may give rise to strumous or scrofulous disorders of the joint, to syphilitic lesions and gouty or rheumatic attacks. Of the accidents to which the joint is liable, dislocations are by far the most frequent, while fractures are not uncommon. Fracture of the acromion process of the scapula, of the coracoid process, of the neck of the shoulder-blade and of the upper part of the humerus are of most common occurrence among these accidents.

SHOVEL-NOSE. See STURGEON.

SHOVELLER, or **SPOONBILL,** a fresh-water duck (*Spatula clypeata*), distinguished by the bill being longer than the head and narrowed at its base, while the tip is hooked and broadened and its fringe-like processes are long and slender. The average length of this bird is about 18 or 20 inches. The male has the head and upper neck bright green, and the lower neck white. The scapular feathers are white. The back is brown, the primary wing-feathers blackish-brown. The tip of the wing is pale blue, as also are the wing-coverts. The tail and upper tail-coverts are black. The breast and belly are light brown or chestnut. It feeds on worms, insects, snails, small fishes and vegetable matters and inhabits lake-margins and marshy spots and breeds numerously all over the northern half of North America as well as in northern Europe and Asia, making its nest on the ground.

SHRADY, George Frederick, American surgeon and editor: b. New York, 14 Jan.. 1837; d. 30 Nov. 1907. He studied at the College of the City of New York and took his M.D. at the College of Physicians and Surgeons, New York, in 1858. He was United States acting assistant surgeon in the Civil War. He was consulting surgeon to the Saint Francis, the Columbus, the General Memorial and the Health Department hospitals in New York, and was consulting surgeon in attendance upon General Grant in his last illness. He edited the *American Medical Times* in 1860–64, and in 1866 founded the *Medical Record,* which he edited until his death.

SHRADY, Henry Merwin, American sculptor: b. N. Y., 24 Oct. 1871; d. 12 April 1922. Graduated at Columbia (1894), studied law, went into business and, finally taking up sculpture as an amateur, developed himself, without the direction of any teacher, into a professional sculptor, being successful in a competition for the execution of an equestrian statue in Brooklyn ($50,000) 1901; of the 'Grant Memorial' for Washington ($250,000) 1902; while he was subsequently commissioned by the Holland Society of New York to make an equestrian statue of 'William the Silent.' His later works include equestrian statues of 'General Williams' (Detroit); 'General Lee' (Chancellorsville, Va.), and a statue of 'Jay Cooke' for Duluth, Minn.

SHRAPNEL. See PROJECTILES.

SHREVE, shrēv, **Henry Miller,** American inventor: b. Burlington County, N. J., 21 Oct. 1785; d. Saint Louis, 6 March 1854. Early in life he engaged in navigation on the Western rivers, and in 1815 ascended the Mississippi to Louisville, Ky., in the *Enterprise,* the first river steamboat. In 1820 he built the *Washington* of 400 tons burden; remodeled it in 1824, so as to operate each of the side wheels with a separate engine; invented the snag boat *Heliopolis* for removing snags from rivers, and in 1829 patented a steam battering ram for harbor defense. In 1826 he was made superintendent of improvements in Western rivers and continued in that office till 1841.

SHREVEPORT, La., the second largest city of the State and the seat of government of Caddo Parish, located in the northwestern section of the State, 18 miles from the Texas line and 170 miles east of Dallas, at the head of navigation on the Red River and on eight railroad systems, including the Texas and Pacific, the Saint Louis Southwestern, the Kansas City Southern, the Houston and Shreveport, etc. The city is the centre of a large territory rich in oil, gas and agricultural produce. It contains the Louisiana State Fair grounds, Saint John's College, Centenary College, Saint Vincent's Convent, Saint Mary's Convent, Youree Hotel, Charity Hospital, Genevieve Orphanage, post office, city hall, courthouse, schools and churches. There are three national banks, two State banks and two trust companies, with combined capital and surplus of about $3,000,000. Parks owned by the city include Princess, Schumpert, Lakeside and Currie Playground. The city has a very large trade in hardware, lumber, groceries and dry goods. Its industrial establishments include cotton factories and compressors, foundries, glass and bottle-works, lumber mills, machine shops, silo factory, stave and barrel plant, oil refining, etc. The total trade has an annual value of about $75,000,000. Pop. (1920) 43,874.

SHREW, one of the minute mammals of the family *Soricidæ* and order *Insectivora,* particularly the Common (*Sorex vulgaris*) and the

Lesser Shrew (*S. pygmæus*). The former are about the size of a mouse, which it somewhat resembles in the shape of the body, feet and tail, but has the muzzle produced far beyond the lip. The shrews have hairy mouse-like bodies and ordinary feet formed for running, and not for burrowing, as in the allied moles; the eyes and ears are comparatively well developed. They live on the ground, though a few are arboreal and others aquatic. The jaws are prolonged and a mobile snout generally exists. There are six upper and four lower incisors, the middle pair of the upper jaw being long and curved. The first lower incisors project horizontally and form with the upper ones a forceps-like structure for the grasping of small insects, which form the larger part of their fare. This family is much the largest one of the Insectivora and the numerous species are found in most parts of the world and present many interesting adaptations.

Within the limits of the United States four genera and about 60 species occur. In the typical genus *Sorex* the ears are large and of normal conformation and the feet are not fringed with stiff hairs. The common shrew is a frail little creature less than three inches long with a scantily-haired tail measuring one inch and may readily be distinguished by its prolonged muzzle and by the teeth being colored brown at their tips. It feeds upon insects and their larvæ and inhabits dry places, making a nest of leaves and grasses. The young, numbering from five to seven, are born in the spring. These little animals are very voracious in their habits and frequently kill and devour one another. *Neosorex* has large feet fringed with stiff hairs and includes the large water shrew, six inches long, as well as several other species. It lives in burrows leading to the water, which it enters in search of snails, etc., upon which it largely feeds. This species is found chiefly in the Rocky Mountain region and central plateau.

Blarina is a characteristically American genus with mole-like fur and the external ear well developed but turned forward in such a manner as to cover the opening and conceal itself among the hair. The short-tailed or mole shrew (*B. brevicauda*) is the best-known species of shrew in the eastern United States. It is about four and one-half inches long with a hairy tail measuring one inch. In general habits it resembles *Sorex*. During the winter it remains quite active and is frequently found on the surface of or burrowing in the snow. At this season it feeds largely on beechnuts as well as hibernating chrysalids and larvæ. It is a bloodthirsty creature and when confined attacks and devours its own kind as well as mice larger than itself. Like other shrews it has upon the knees and elbows glands, the secretion of which give it a peculiar and disagreeable odor.

Among interesting exotic species the following may be mentioned: the European and Asiatic water shrew (*Crossapus fodiens*) attains a total length of from four and one-half to five inches. The fur is of delicate texture and adapted to resist the action of water. A prominent fringe of stiff white hairs is found on the tail as well as the toes of this form, this fringe forming a distinctive feature of the species. The teeth are also fewer than in the American water shrew. The food resembles that of the common shrew, but aquatic larvæ and the young of fishes appear to form a large part of its nutriment. They are of very active habits, diving and swimming with great facility. The musk-shrew (*Crocidura cærulea*) of India is remarkable for the strong musky odor which emanates from glands situated on the sides of the body. It enters houses at night to feed upon cockroaches. Resembling the *Soricidæ* are the elephant-shrews (*Macroscelidæ*). They have the zygoma and auditory bulla developed and the muzzle forms a slender, proboscis-like organ with the nostrils at its tip. The eyes are of moderate size and the ears well developed and covered with hairs. The fore feet are short and possess five toes, while the hind legs and feet are very long and are provided with compressed claw-like nails. The tail is elongated and slender. The elephant shrews or jumping shrews are confined to Africa. The favorite attitude of these creatures is a sitting posture, much resembling that of the jerboas and kangaroos, and from the greater length of the hind as compared with the fore limbs they also, like these animals, progress by leaping. They inhabit dry rocky situations, feed on insects and other small Invertebrata and are nocturnal. Consult Dobson, 'Proceedings Zoological Society' of London (1890); Dobson, 'Monograph of the Insectivora' (London 1882–90); Merriam, 'Mammals of the Adirondack Region' (New York 1884); and Merriam and Miller, 'North American Fauna No. 10' (Washington 1895).

SHREW-MOLE, a large mole (*Scalops aquaticus*) inhabiting wet meadows and the borders of marshes and streams throughout most of North America. See MOLE.

SHREWSBURY, shrooz'bŭ-rĭ, England, the county-seat of Shropshire, on the left bank of the Severn, 42 miles northwest of Birmingham and 163 miles northwest of London. The town is unusually picturesque. The bridges are interesting features, four of them spanning the river, which here takes a winding course around the hills. The streets are narrow and steep and bordered by old frame houses. An archway of the period of James II and two towers of the reign of Edward I are parts of the old castle built by Roger de Montgomery. Saint Mary's, an interesting church of the 10th century; Saint Giles'—dates from the reign of Henry I;—Holy Cross, early Norman, and Saint Alkmonds are the most noteworthy churches. The other public buildings are public halls, museum, free library, market-house—including corn exchange—barracks and Royal Grammar School. The industries include glass-staining, agricultural implements, foundries, tobacco, tanning and brewing. Pop. about 30,000.

SHRIKE, or **BUTCHER-BIRD**, a bird of the passerine family *Laniidæ*, and especially of the typical group *Laninæ;* several other subfamilies are not represented in North America. The true shrikes have the bill broad at the base, and hooked and toothed at the tip, resembling the bill of a bird of prey. A dense tuft of bristles surrounds the nostrils and others project from the base of the bill. The feet are small, and, except for the laterally scutellate structure, are of typically passerine type. The shrikes feed chiefly upon insects, reptiles, small mammals and small birds and their young. About 200 species of shrikes are found in all parts of the world, and four species of *Lanius* within the United States. Other individual names are the Great Gray Shrike (*L. excubilor*), the Lesser Gray Shrike (*L. minor*) and the Red-backed Shrike (*L. colluris*), the latter, like *L. septentrionalis*, being often called the Nine-killer Shrike. The loggerhead shrike (*L. ludovicianus*) is the usual summer species of the eastern United States, where it is resident southerly and migratory in the North. These birds are seen usually in pairs flitting about the borders of woods and along fence-rows. The food consists chiefly of insects which the male is said sometimes to impale on thorns. They also attack the young of other birds. The nest is generally built in bushes and is of large size and composed of grass and weeds lined with hair and feathers. The eggs, usually five in number, are white, tinted with green and spotted with brown of various hues. The loggerhead shrike is eight or nine inches long, slate-colored above and plain ashy white below, with a black stripe through the eyes and meeting across the forehead. In the West it is replaced by two sub-species, the white-rumped and the California shrikes.

The Great Northern shrike (*L. borealis*) is found in the United States only in winter and breeds in British America. It is 9 to 10 inches long, marked below with numerous fine, wavy, dusky lines and the eye stripe is interrupted on the forehead. The nest is built in trees and the four to six eggs are similar to those of the loggerhead shrike. The song is harsh, but this bird possesses considerable imitative powers. The food consists of mice, shrews, insects and in winter especially of small birds. This species especially has a habit of suspending its prey upon thorns or fence splinters, or in forks of tree-branches. The significance of this remarkable habit is not understood. By some it is believed to be a storage of food; by others only an effort at convenience in eating the prey.

Closely related species of shrikes with similar habits occur in Europe and more distinct ones in other countries. The *Oreœca cristata* of Australia lives chiefly on the ground and is noted for its peculiar and somewhat ventriloquial song, which begins with low notes and gradually increases in height and power so as to delude the hearer into fancying that the songster has been gradually coming from a great distance toward him. It is sometimes called the bell-bird. The piping-crow (q.v.) and the pied crow-shrike (*Strepera graculina*), of New South Wales, represent a distinct sub-family. Various other birds have been named "shrikes," of which the most important are the bush-shrikes which belong with the ant-birds in the family *Formicariidæ*. Consult Gadow, 'Catalogue of the Birds of British Museum,' Vol. XV (London 1890); Evans, 'Birds' (London 1900); Newton, A., 'Dictionary of Birds' (New York 1896).

SHRIMP, a small decapod crustacean (see DECAPODA; CRUSTACEA) of the genus *Crangon*, allied to the lobster, crayfish and prawn. They inhabit sandy coasts and in Europe are caught for market in immense numbers by nets when swimming about near the beach at high tide. The familiar species, *C. vulgaris*, about two inches long, greenish-gray dotted with brown, is esteemed as an article of food. A related species (*C. franciscorum*) is found on the California coast where it has considerable commercial importance, being gathered and dried by the Chinese. The red color exhibited by shrimps when prepared for the table is the result of a chemical change during cooking, they being naturally translucent and colored much like the sand in which they live. A very great number of crustaceans more or less closely related to the shrimps live in the sea and a few in fresh water. Consult Stebbing, 'Crustacea' (New York 1903).

SHRINE, the case in which holy relics are kept. Shrines are usually richly ornamented with gold, precious stones and elaborate carvings. The earliest form of shrines was that of the diminutive model of a Gothic church with high-pitched roof. Some shrines, as that of Saint Alban, Britain's protomartyr at Saint Albans, that of Saint Edward the Confessor at Westminster, of Saint Genevieve at Paris, were imposing architectural structures. The shrine of Saint Charles Borromeo in the Duomo of Milan is of beaten silver faced with rock-crystal.

SHROPSHIRE, a breed of sheep (q.v.).

SHROUD, a word derived from the Anglo-Saxon "scrud," a garment, and meaning more especially the winding-sheet in which it was customary to wrap the dead. This custom has been generally abandoned and the dead are buried in ordinary clothing, retaining to the last as far as possible the aspect they presented in life. The shroud has figured in many ghost stories.

SHROUDS, large ropes stretched from the heads of the lower masts to both sides of a ship, where they are fastened to the dead-eyes, which are secured to the channels, to support the masts, and named according to the masts to which they belong, the main, fore and mizzen shrouds.

SHROVETIDE, the three days between the evening of the Saturday before Quinquagesima Sunday and the morning of Ash Wednesday; so called because anciently people were wont on those days to make confession of their sins and to obtain absolution (to be *shriven*) in preparation for the season of Lent. The Tuesday of Shrovetide is called Shrove Tuesday; its evening was given up to merrymaking and to feasting on pancakes and fritters: hence the name Pancake-Tuesday or Pancake-night: in French Shrove-Tuesday is Mardi-Gras (q.v.).

SHRUBS are woody-stemmed plants of low stature. They often have several slender main stems and branch close to the ground, retaining these lateral shoots, which are lignified, and bear fruit repeatedly. The lines of difference between herbs and shrubs, and shrubs and trees, are arbitrary and difficult to define exactly. Undershrubs are those perennials which send up from underground stems annual shoots that do not become woody and die off in the autumn as do those of *Salvia pratensis*. A semi-shrub is practically the shrubby herb, whose yearly shoots become woody only at the base before the next period of vegetation and wither and die off above this. The small shrub is a low or even trailing plant like *Deutzia*

gracilis and *Epigæa repens*. When larger and much branched, the shrub is called a bush; and when so large as to resemble a tree, as the syringa often is, it becomes arborescent. Some of the shrubs are even climbing plants, like *Celastrus scandens*, the bittersweet, and certain roses. Like trees, shrubs may be deciduous or evergreen, and are often thorny. They are apt to grow in almost impenetrable thickets, with interwoven branches, and form fringes of vegetation on forest edges, in swamps, fields and moors. They are extremely useful to the horticulturist for their flowers and for their fruits, often of economic value; and to the landscape gardener, for concealing fences and buildings, and for softening the edges of trees masses.

SHUBRICK, shŭ'brĭk, **John Templar,** American naval officer: b. Bull's Island, S. C., 12 Sept. 1788; lost at sea in the sloop-of-war *Epervier,* 1815. He entered the navy as midshipman in 1806, served on the *Chesapeake* in her encounter with the *Leopard* in 1807 and in 1812 was promoted lieutenant. He was assigned to the *Constitution,* participated in her engagement with the *Guerrière* in 1812 and was later on the *Hornet* during her engagement with the *Peacock* in 1813, receiving medals from Congress for his services. He was second lieutenant of the *President* when she was captured in 1815 and in the war with Algiers in that year was lieutenant of the *Guerrière,* the flagship of Commodore Decatur, with whom he was engaged in all the movements against the Barbary powers. Upon the conclusion of peace he was commissioned to bear the treaty to the United States. He sailed in command of the *Epervier* early in July 1815 and was never again heard from after passing Gibraltar.

SHUBRICK, William Brandford, American naval officer, brother of John Templar Shubrick (q.v.): b. Bull's Island, S. C., 31 Oct. 1790; d. Washington, D. C., 27 May 1874. He entered Harvard in 1805, but was appointed midshipman in 1806. He attained rank as lieutenant in 1813, was placed in command of a gunboat in Hampton Roads, was engaged in the defense of Norfolk and the navy yard at Gosport and later in that year was transferred to the *Constitution.* He participated in the capture of the *Cyane* and the *Levant* by that vessel and was voted a sword by his native State and a medal by Congress in recognition of his services. He sailed around the world in the *Washington* in 1815–18, the first United States vessel to make that cruise, was appointed commander in 1820 and served until 1826 in command of the navy yards at Charlestown, Mass., and at New York. In 1826 he was appointed to the command of the *Lexington,* was commissioned captain in 1831 and in 1838–40 was in command of the West India squadron. He had charge of the Norfolk navy yard in 1840–43, was chief of the bureau of clothing and provisions for the navy in 1845–46, in the latter year was appointed to command the Pacific squadron, captured several ports during the Mexican War and in 1852 was appointed to the Lighthouse Board. He was in command of the Atlantic Coast squadron for a time in 1853 and then resumed his duties as chairman of the Lighthouse Board, in which post he remained until his retirement with the exception of 1858–59, when he was in command of the Brazil squadron and Paraguay expedition. He was retired in 1861, but remained on the Advisory Board until 1870; in 1862 he was commissioned rear-admiral.

SHUCKBURGH, Richard, surgeon in British army, reputed author of 'Yankee Doodle': b. about 1705; d. Schenectady, August 1773. He appeared in America in 1735. In 1737 he was commissioned surgeon to the four independent companies of foot at New York. Tradition says he wrote the original humorous stanzas of 'Yankee Doodle' to an old and familiar English jig and palmed them off as a famous march-song upon the motley New England volunteers that joined the British regulars at Fort Crailo, near Albany, N. Y., for the expedition against Canada during the French and Indian War. A Richard and Mary Shuckburgh baptized a child John at Albany, 15 March 1747. Shuckburgh became interested in the Indians about 1748 and seems to have been in friendly relations with Sir William Johnson, long-time colonial Indian commissioner and who made him secretary of Indian affairs in 1759. Dr. Shuckburgh was then residing at Schenectady and was by turns with the army and under Johnson until August 1773 when his death was announced in the *New York Gazette* as a "gentleman of very genteel family and of infinite jest and humour."

SHUFELDT, shoo'fĕlt, **Robert Wilson,** surgeon and biologist: b. New York, 1 Dec. 1850. He studied at Cornell University, school of engineering, but withdrew in 1873 to study medicine at Columbian, now George Washington University, where he was graduated in 1876, receiving the prize for the best thesis, '6000 observations on temperature of children,' since published. He had seen service early in the Civil War; became surgeon with Generals Merritt, Crook and Sheridan in frontier Indian wars 1876–81. He was appointed curator Army Medical Museum, Washington, 1882; honorary curator Smithsonian Institution 1895; judge at the World's Fair, Chicago, 1893; honorary member Royal Australasian Ornithological Union and in 1914 elected by that society to be delegate British Association for the Advancement of Science, Melbourne. He is author of nearly 1,300 titles (10,000 illustrations) to books, memoirs, papers, articles, etc., devoted to ornithology, anatomy and physiology of the vertebrata; osteology of birds, mammals and fishes; nature study, art, travel, photography, taxidermy, medico-legal studies, medicine and surgery, reptiles, fossil animals, zoological gardens and their management, psychology, sociology, popular botany, reviews and critiques, etc., with formal works on 'The Negro'; 'Studies of the Human Form'; 'Myology of the Raven'; 'Chapters on the Natural History of the United States'; Osteology of Birds,' etc.

SHULL, George Harrison, American botanist: b. Clark County, Ohio, 15 April 1874. He was graduated at Antioch College in 1901 and took his Ph.D. at the University of Chicago in 1904. He was botanical expert at the United States Bureau of Plant Industry in 1902–04; assistant in plant physiology at the University of Chicago in 1903–04; botanical investigator at the stations for experimental investigation at Carnegie Institute, Washington, and at Cold Spring Harbor in 1904–15; and has since been professor of botany and genetics at Princeton University. He is managing editor of *Genetics* and associate editor of the genetics department of *Botanical Abstracts.*

SHUMAGIN (sho'mą-gĕn) **ISLANDS,** Alaska, a group of islands south of the Alaska Peninsula, 150 miles east of its tip and 950 miles southwest of Sitka. They were discovered by Bering in 1741. The island Unga is the headquarters of the Alaskan cod-fishing industry. Fox-farming is projected for several of the islands.

SHUMLA, shoom'lä, or **SCHUMNA,** Bulgaria, a town 56 miles west of Varna, surrounded by the hills of the Balkans. It is by the formation of its surroundings a natural stronghold. A series of outworks, strong redoubts, a citadel and batteries have been added to its defense. Furthermore several roads, military and otherwise, radiating from this point, lend to it additional importance. Much business is transacted around the large square. Interesting features are the mosques; a fine mausoleum (18th century) of the Grand Vizier Djezzar-Hassan-Pasha; the barracks and the baths. Shumla is the residence of a Greek archbishop. The railroad station bears the name of "Shumla Road," a legacy of the English engineers who built the line between Rustchuck and Varna. There are important manufactures of copper, silk, leather, clothing and slippers, and an extensive trade. The Russians made three unsuccessful attempts to capture the town; it capitulated, however, in 1878. Pop. 23,000.

SHUNT. See ELECTRICAL TERMS.

SHURTLEFF, Roswell Morse, American artist: b. Rindge, N. H., 14 June 1838; d. 6 June 1915. He was graduated at Dartmouth College in 1851; worked at lithography and drawing on wood till 1861, when he enlisted with the 99th New York Volunteers, of which he became lieutenant and adjutant. He was the first Union officer wounded and taken prisoner in the war, 19 July 1861, and was not released until after nearly eight months' imprisonment. Illustration of books and magazines absorbed his efforts for many years, but he began to paint in 1870 and executed numerous landscapes in both water and oil, largely transcripts of scenery in the Adirondacks.

SHURTLEFF COLLEGE, located at Alton, Ill. It was founded by the Baptists and first opened to students in 1827. John M. Peck, the first Baptist Home Missionary to the West, was one of the most active agents in its founding. The organization includes a preparatory department, a collegiate department and a conservatory of music. There are three regular college courses, leading to the degrees of A.B., B.S., and Ph.B., respectively. All departments are coeducational. The buildings and grounds and other property are valued at a total of $650,000 and the annual income amounts to $51,755. The library contains 30,000 volumes and the enrolment shows 186 students. The faculty numbers 18.

SHUSHWAP, shoo'swŏp (correctly *Sequapmug*), North American Indian tribe of Salishan stock, living in British Columbia between Fraser River and the Rocky Mountain Divide, and between the Quesnelle and Thompson rivers. They are the most important Salishan tribe of British Columbia, and are neighbors on the north of the Athapascan tribe of Tsilkotin, and on the south of the Salishan tribes of Okanagan, Ntlakyapamuk and Lillooet. They occupy villages which are reservations under the Okanagan and Williams Lake agencies. They built circular, underground houses, did not follow the clan system and their women were skilled in weaving baskets and matting. Their numbers dwindled to about half after the country was opened by the miners, but are now slightly on the increase. They are for the most part civilized and Christians.

SHUSTER, William Morgan, American lawyer and financial expert: b. Washington, D. C., 23 Feb. 1877. He was educated at the Columbian (now the George Washington) University, and in 1899–1906 was in the United States Customs Service in Cuba and in the Philippines. In 1906–09 he was a member of the Philippine Commission and secretary of public instruction in the Philippine Islands. From May 1911 until January 1912 he was Treasurer-General and financial adviser to Persia. He became involved in difficulties through his determined opposition to Russian intrigue in Persia, however, and was forced to resign, the circumstances at the time attracting world-wide attention. He has been connected with the publishing house, the Century Company, since 1915. Author of 'The Strangling of Persia' (1912).

SHUSTER, shoos'tĕr, or **SHÚSHTAR,** Persia, in the province of Khuzistan, on the Karun, 250 miles southwest of Ispahan. It is a walled town, defended by a castle. It is favorably situated for commerce. The houses, of stone, are built with two stories underground. Wandering tribes, which generally camp with their flocks and herds in the vicinity during the winter, add considerably to the population. The inhabitants are noted for their hospitality. The site of the ancient Susa is not far from Shuster. Pop. about 18,000.

SHUTE, Henry Augustus, American author: b. Exeter, N. H., 17 Nov. 1856. He was graduated at Harvard University in 1879, was admitted to the bar in 1882 and from 1883 was police justice at Exeter. He is known for his humorous books, chiefly delineating boy character, but written for adults. Author of 'The Real Diary of a Real Boy' (1902); 'Letters to Beany and Love Letters of Plupy Shute' (1905); 'Real Boys' (1905); 'A Profane and Somewhat Unreliable History of Exeter' (1907); 'A Country Lawyer' (1911); 'Plupy "the Real Boy"' (1911); 'The Mis-adventures of Three Good Boys' (1914); 'The Youth of Plupy' (1917); 'The Lad With the Downy Chin' (1917), etc.

SHUT-IN SOCIETY, an American organization established in order to soften the lot of invalids by supplying various desirable objects which might otherwise be unattainable. Local societies, besides supplying their sick members with fruit, flowers, reading material, medicines and nourishing foods, also undertake to supply easy chairs and other helps to convalescence.

SHUTTER, Marion Daniel, American Universalist clergyman: b. New Philadelphia, Ohio, 4 Aug. 1853. He was graduated from the

University of Wooster, Ohio, in 1876, from the Baptist Theological Seminary, Chicago, in 1881, and was ordained in the Baptist ministry. He was in charge of the Olivet Baptist Church, Minneapolis, for some years, but afterward changed his views and became pastor of the First Universalist Church there. He has published 'Wit and Humor of the Bible' (1892); 'Justice and Mercy' (1894); 'Applied Evolution' (1900); 'The Way the Preachers Pray' (1900); 'Life of James Harvey Tuttle' (1905); 'Report of the Minneapolis Vice Commission' (1910), etc.

SHUTTLE, an instrument used by weavers for shooting or passing the thread of the weft from one side of the web to the other, between the threads of the warp. It is a boat-shaped piece of wood which carries a bobbin or cop containing the yarn of the weft or woof. The shuttle sometimes has wheels to facilitate its motion.

In a sewing machine, the sliding thread-holder which carries the lower thread between the needle and the upper thread, to make a lock stitch. In hydraulic engineering, the gate which opens to allow the water to flow onto a wheel. That side of the wheel which receives the water is known as the shuttle side.

SHUTTLEWORTH, Edward Buckingham, Canadian bacteriologist and chemist: b. Sheffield, England, 1842. He was educated at Dublin and at the Royal School of Mines, and removing to Toronto, Canada, became identified with the development of the chemical industry there. In 1866 he was one of the founders of the Canadian Pharmaceutical Society which later became the College of Pharmacy, in which Shuttleworth was dean and professor of chemistry in 1882–91. He was also a member of the medical faculties of Victoria and Trinity universities, and of the Ontario Medical College for Women. He was city bacteriologist of Toronto for some years prior to his retirement in 1907.

SHYLOCK, a character in Shakespeare's 'Merchant of Venice.' He lends Antonio, a merchant of Venice, 3,000 ducats on condition that in the failure to pay in three months the forfeit shall be a pound of the merchant's flesh cut off wherever Shylock chooses. His purpose is defeated by Portia, representing a young lawyer equipped with the opinion of Bellario, a learned doctor of Padua. Up to the time of Macklin, who played Shylock in 1741, the part had been always represented by the low comedian, and was given a broadly humorous interpretation. Macklin invested it with tragic qualities and represented the Jew as a revengeful, inexorable money lender. In 1814 Edmund Keane presented the part so as to elicit sympathy for one who was ill-used by circumstances. Modern opinion concurs in that he was the victim of a quibble and that even on the point of his conspiracy against the state his conviction was of doubtful propriety.

SI-KIANG, sē-kē-äng′, or **WEST RIVER,** China, the most important of the streams which unite to form the Canton River. It rises in the province of Kwang-si, and is navigable for vessels drawing 12 feet 75 miles from the sea. It is also called the Blue River, from the remarkable purity and clearness of its waters. By it are conveyed the sugarcanes that grow in the vicinity, as well as the rafts of timber from the forests of Kwang-si to the markets of Canton.

SIA (sē′a) **INDIANS,** a Pueblo tribe of New Mexico. See QUERES.

SIALOGOGUE, any medicine which promotes the flow of saliva. Such medicines are either vegetable or mineral. The former embrace most of the pungent plants, particularly sorrel, tobacco, pellitory root and mezereon; the latter, several of the metals, when taken constitutionally, especially mercury. The first are called masticatories, because the effect is produced merely by chewing.

SIAM, sī-ăm′ or sē-ăm′, a country of eastern Asia, on the peninsula of Indo-China, extending between 4° and 21° N. lat. and between 97° and 106° E. long., lies between French Indo-China on the northeast and east and British Burma on the northwest, with the Gulf of Siam on the south. The greatest length of the country is over 1,000 miles from north to south, and over 500 miles from east to west; total area, about 200,000 square miles. A natural boundary is the range of mountains extending from north to south along the frontier of Lower Burma to the Malay Peninsula. There are also mountains to the north, while great fertile plains stretch toward the south, mainly drained by the Menam and its tributaries. On the 1,700 miles of coast line there are several fine harbors. The most important part of Siam lies in the valley of the Menam, the country of the true Siamese. The boundaries on the Bay of Bengal reach from Burma in a southerly line to the northern frontier of Kelantan and Kedah in the Malay Peninsula in the latitude of about 7° S. The island of Junck Salong, separated from the mainland by the Pak Phra Strait, is rich in tin ore deposits and belongs to Siam. The principal river is the Menam («mother of waters»), which rises in the mountains and runs a course of 600 miles, being fed by the waters of the Meping, the Me-ing, the Me-Wang, the Me-mamfe and numerous smaller streams. It falls into the Gulf of Siam by three channels 18 miles below Bangkok. The Meklong and the Bangpakong flow into the Gulf of Siam, while the Mekong, the greatest river of the Siam Peninsula, has a great part of its course along Siamese territory, but navigation for vessels of any size is impeded by rapids. This river is usually identified with the Lan-tsan, which rises near Chiamdo in Tibet and flows for 2,800 miles in a generally southward direction to the China Sea, which it enters by several mouths in Cochin-China, a country formed by its deltaic deposits. Formerly the Lai Mountains were claimed as the eastern boundary, but in 1893 the French pressed the claims of Annam to the territory between the mountains and the river, and the Siamese were compelled to retire, since when the Mekong forms in great part the boundary between Siam and Indo-China. Other rivers are the Tachin in the west and the Salwin along the northwest boundary. The Menam annually overflows its banks in the plains and covers them with a thick layer of fertile soil, in the same way as the Nile. The plain of the Menam Valley, the adjoining eastern coast and the Korat Plateau (from 400 to 1,000 feet high)

occupy the greater part of the country. These plains are fringed by hills up to 5,000 feet high. Only the land adjoining the rivers is under cultivation; a great part of the country is covered with thick jungle. Geographically Siam falls into three well-defined regions: the mountainous region west and northwest; the great central plateau extending to the sea on the south; and Lower Siam, a narrow strip of land from 40 to 100 miles wide and forming the northern part of the Malay Peninsula.

Climate.—A tropical climate prevails in Siam. Though it varies with the latitude and elevation of its surface, there are but two seasons — the wet and the dry. The former extends from May to October, when the southwest trade wind blows; the latter from November to April, with a continuously clear sky. The annual average temperature is 82° F. The heat increases during February and March, reaching to over 100° in April, the hottest month. The coolest period is between November and January, when the thermometer often goes down to 62°. Work is suspended during the hot hours of the day. The heaviest rainfall occurs in July and August, which months also are extremely hot. For foreign visitors the climate is unhealthy owing to the many kinds of epidemics, especially malaria, which prevails in the jungle regions. The best months for visiting Siam are between November and January.

Minerals.— Gold is extensively diffused and is obtained in tolerable purity. Copper, iron, tin, precious stones, coal and nitrate deposits are found in different parts. European gold prospectors have met with little success, owing to climatic and other difficulties. The few gold mines now actually worked are owned by Chinese and are situated chiefly in the Malay Peninsula. Northern Siam formerly produced a considerably quantity of iron, but very little is now extracted; all that is used in the country is imported. The coal is of poor quality. Rubies and sapphires are found in plenty, mainly in the southeast of Chantaburi province. Siamese sapphires enjoy a world-wide reputation for excellence. The only large output of mineral is tin, the principal mines for which being those of Puket Island, Takuapa, Panga, Trang and Gherbi on the west coast of the Malay Peninsula, and of Nakon, Rahman, Sritamaraj and Jalar on the east coast. Zinc and antimony are also found east of the Menam.

Vegetation.— Rice and maize are the grains most extensively cultivated in the country. Of the tropical farinaceous roots the Siamese raise the usual varieties, and among others the sweet-potato. Cocoa and areca palms are numerous, especially the former, in the lower districts, and the oil is extensively exported. No part of the East is more celebrated for the abundance and quality of its fruits. The mango, mangosteen, litchi, durian, pomegranate, guava, pine-apple, and, in short all the fruits of southeastern Asia, the Indian Islands and tropical America, are abundant and of exquisite quality. The cultivation of the sugarcane is carried on on an extensive scale. Black pepper of good quality, tobacco and cotton of several sorts are largely produced. Sappan-wood is procured extensively from the forests between lat. 10° and 13°, and in point of quantity it forms one of the most considerable of the Siamese exports. Excellent teak-timber abounds in the forests of Upper Siam and is much used in the construction of junks and temples. There is also a large foreign demand for it as timber for shipbuilding.

Animals.—Among carnivorous animals are the tiger and leopard, the bear, otter, the musk-civet, the cat and the dog, both wild and domestic. The celebrated Laos cats, with light chocolate-colored hair and blue eyes, are a Siamese product. Porcupines, squirrels, rats and mice are common. The orang-utan and other species of apes are abundant. Among the ruminating quadrupeds are found seven species of deer, the sheep, goat, ox and buffalo. The single-horned rhinoceros is met with in unusual numbers and is hunted for its hide and horn, both of which are exported to China. The principal boast of the Siamese, however, is in the high perfection of their elephants, which here attain a size and beauty elsewhere unknown, and are held in high esteem throughout India. Ordinary elephants are employed in heavy labor, but the white (really light ashy-gray) elephant, Chang Phenak or Albino elephant, is a sacred animal and is worshipped as such by all classes of the people; in fact, that worship is now confined to Siam, having died out in India and elsewhere. The well-known Siamese red flag, with a white elephant, was abolished in 1918. Among the birds the water-birds and waders are by far the most numerous; geese, ducks, boobies, cormorants, king-fishers, storks and pelicans are frequent; the forests abound with peacocks, pheasants and pigeons, and in the islands are large flocks of the swallows that produce the famed edible birds'-nests. Crocodiles, geckoes and other kinds of lizards, tortoises and green-turtles are numerous, the last of which, as well as their eggs, are in great request among the Siamese as an article of food, and from their sale add not inconsiderably to the royal revenue. The python serpent attains an immense size and there are many species of snakes. The fish of the Menam are abundant.

Population.— The capital of Siam is Bangkok (q.v.), with a population of nearly 630,000. The first complete census of the country was taken in 1909; the latest available statistics estimate the total population at about 8,500,000, of whom about 500,000 are Chinese. Some authorities even place the number of Chinese as high as 1,000,000. Besides these and the pure Siamese the inhabitants include Laos, Burmese, Cambodians, Malayans and Annamese, all members of the great Mongolian family. These are generally not temporary sojourners in the land, but fixed residents, in many cases the descendants of people who settled there centuries ago. They are now hardly distinguishable from the Siamese natives. There are also cross-breeds between these different races and between them and the pure Siamese stock, which is estimated at about 2,000,000 of the entire population. In stature they do not average more than five feet three inches in height; they have a lighter-colored skin than the western Asiatics, but darker than the Chinese. They are inclined to obesity, have large lower limbs and stout, long arms; yet they are by no means a strong or

robust race. Their faces are broad and flat, with round prominent cheek-bones, a small nose obtusely pointed and rather hollow at the bridge, a large mouth and rather thick lips, the lower jaw long and square at the back, small black eyes, a low forehead and very scanty beard. Their hair is always black, thick, coarse and loose, worn close by both sexes, except from the forehead to the crown, where it is about two inches long and made to stand erect. The children's heads are shaven, even just after birth, except at a small spot near the forehead, where a small tuft of hair is left. As this grows longer it is plaited and fastened with metal pins, which are jeweled among the wealthy. This tuft is shaved off on reaching the 11th year (adolescence), both in the case of boys and girls, a ceremony which forms an important event in the family history, being performed on an auspicious (astrological) day by some prominent personage in the town or village. In the royal family the king performs this tonsorial operation himself. The customary marriage age is 17 or 18 for young men and 14 to 15 for girls. Weddings are conducted with much pomp and ceremonial. Polygamy is permitted, but the first wife retains a position of pre-eminence over the others. Monogamy is the custom among the lower orders and especially among those of the upper classes who have received a European education. Disposal of the dead is by cremation, except in the cases of those who have died an unnatural death, within which category the victims of epidemics were formerly included. Immediately after death the body is externally embalmed, placed in a large jar, which is sealed up, and preserved in the house for some months before the cremation takes place in accordance with Buddhist rites. The final ceremony is carried out amid rejoicing, theatricals and fireworks to cheer the soul of the departed.

The dress both of men and women consists of the *panung*, a yard-wide piece of cloth three yards long, which is wound round the waist so that it hangs down and covers the thighs. Most of this cloth, formerly homespun, is now machine-made and imported from Great Britain and India. Silk is used instead of cotton by the wealthy and nobility; the ladies of the court have *panungs* of seven different colors, one for each day of the week. Those who can afford to wear shoes and stockings; the majority go bare-footed.

The staple foods are rice and fish, with which a small quantity of hot water or tea is taken. The food is placed in dishes on the floor; the family squat around these and eat with their fingers. Spoons, forks and knives are used by the upper classes. Foreign drinks are confined to a very limited circle; the intoxicating beverage of the people is *arak*, which is brewed from rice or sugar. Opium is less popular than in China; it was prohibited in 1838, but is now a government monopoly. Tobacco is more commonly used for chewing than smoking. Betel-nut chewing is a habit common to all women; at banquets it takes the place of dessert.

Theatres, moving-picture shows and open-air sports such as kite-flying and football are very popular among the Siamese, who also patronize cock-fighting and fish-fighting exhibitions in large numbers, at which much betting is done in "backing favorites." Gambling houses and lotteries run by Chinese do a highly-profitable business and contribute large sums to the revenue. The great festival of the year is the birthday of Buddha and lasts three days. It comes about a week after New Year's Day, the latter falling on the first of April. The first day is devoted to feasting, the second to religious exercises, and the third to games, entertainments and gambling. All the different races in the country participate in this festival. The *Ten Nam* or "Water-Drinking Ceremony" is observed twice a year, when the royal family and state officials assemble in the temple, present themselves to the king and drink water from a golden jar. Early in May occurs the "Rice-Planting Ceremony," at which the Minister of Agriculture officiates and the king not infrequently attends *incognito*.

Religions.— The state religion is Buddhism, to which creed nearly all the people subscribe. Every other faith, however, is welcomed, whether Christianity, Hinduism or Islam. Land is readily granted for the erection of churches, mosques and temples. Religious persecution is not — and never has been — known in Siam. Buddhism was introduced from India between the 5th and 6th centuries A.D. in the form of the so-called Great Vehicle School — such as is now observed in China, Japan and Tibet. Since 1044, when the doctrine of the Small Vehicle School, compiled by King Parakkamabahn of Ceylon, was translated into Siamese, the people finally adopted Southern Buddhism as is also practised in Burma, Cambodia and Ceylon (see BUDDHISM). There are about 10,000 monasteries in Siam, with about 300,000 inmates. It is customary for every man to spend some time under monastic discipline, whether in youth, middle or old age. Some stay for a few months, some for several years and others for life. The inmates are graded according to attainments in scholarships. The two great branches of Christianity number many converts. The Roman Catholic mission began its labors in 1660 and has now about 50 churches in the country. The American Presbyterians also maintain an active mission.

Language.— The Siamese language is based on the Sanskrit, Chinese, Cambodian, Laos and Malay languages. Most of the words are monosyllable and are pronounced, as in Chinese, with different intonations or inflexions of the voice. There are five of these vocal accents, which are indicated by signs. Thus the same word, when pronounced in five different tones, has five different meanings, e.g., the word written *song* means, according to inflexion, "envelope," "to shine," "to hide," "noisy" and "two." Abstract nouns are largely represented by Sanskrit words.

Government.— Siam is the only independent country on the Indo-China Peninsula; it is an absolute monarchy without a constitution. The king rules with the aid of a Cabinet (Senabodi) made up of nine Ministers, Foreign, Interior, War, Navy, Local Government, Justice, Finance, Education and Agriculture. Most of these offices are held by members of the royal family. Together with other members the council numbers about 40 officials. They are assisted by British and other foreign advisers.

For administrative purposes the country is divided into the metropolitan district of Bangkok (Krung Teb) and 17 *monton* or provinces: (1) Krung Kao, (2) Chantaburi, (3) Surat or Chumporn, (4) Nakorn Chaisri, (5) Nakorn Rajasima or Korat, (6) Nakorn Sawan, (7) Nakorn Sritamara, (8) Patani, (9) Prachinburi, (10) Pitsanulok, (11) Payab, (12) Petchaburi, (13) Puket, (14) Rajaburi, (15) Roi Et, (16) Ubon Rajatani, (17) Udorn. A high commissioner governs each of the provinces and the district by royal authority. Each commissioner has several subordinate *muang* governors under him, while tributary districts are ruled by their own chiefs. The financial adviser to the government is usually a British officer.

Justice.— The judicial system consists of a primary or Muang Court and a higher Monton Court in each province; the Court of Appeal and the Dika (Supreme) Court sit in Bangkok, where there is also a Court of Foreign Causes, to decide disputes between foreigners and between them and the natives.

Education.— From early ages a system of elementary education has been conducted in the monasteries by the Buddhist monks. A modern system has been introduced in recent years, which is operative as yet only in the capital, whence a number of students are sent abroad every year. Steps were taken in 1917 to establish a university at Bangkok.

Defense.— Conscription on the European model obtains, but with numerous legal exemptions, while the uncivilized tribes are not called on to serve. The army consists of 10 divisions, each of two infantry and one cavalry regiments, two four-gun batteries and an engineer battalion. The peace strength is about 12,000 men. The navy is composed of 25 ships, mainly small gunboats of little fighting value. About 5,000 men are available for service, while some 20,000 are in the reserve. Most of the vessels are Japanese-built.

Communications.— There are state and private railroads in Siam, with a mileage of about 1,300. The former are the North Siam Lines, from Bangkok to Korat; the Eastern Line from Bangkok to Petriu; the River Line, within Bangkok; the Sawankaloke Line, Northern Line and South Siam lines. The private lines are the Paknam Light Railway, Meklong Railway and the Prabat Line, which was built and is owned by a Siamese. There is little traffic and trains run only in the daytime.

Shipping.— The Siam Navigation Company run two coastwise lines from Bangkok. As most of the towns are on the river, there is a heavy river and canal traffic carried on in native boats. Many foreign vessels enter the port of Bangkok every year, while a Siamese company maintains a regular service between the capital and Hongkong and the southern China ports since 1909.

Commerce and Industries.— Most of the internal trade of Siam is in the hands of Chinese. Foreigners (Europeans) control practically the whole foreign trade. Agriculture is the principal industry, and rice the chief product, which is exported in large quantities. For other products, see sections, *Minerals; Vegetation*. The Siamese have made but little progress in the useful arts. House-carpentry, canoe and junk-building, manufacturing pottery and coarse cutlery, leather-dressing and the construction of musical instruments are their chief mechanical employments. A few rude hand-looms are in operation, chiefly worked by women, but the fabrics, whether of silk or cotton, are of coarse quality. Their domestic architecture is in an equally rude and backward state — the houses of the lower orders being formed wholly of wood or bamboo, roofed with palm-leaves and mostly raised on piles, as in the rest of ultra-Gangetic India. Not many houses in the capital are built with brick and mortar. Many of their houses, too, are constructed on boats, which abound on the river near Bangkok.

History.— Siam appears to have no place in history prior to 638 A.D., and the credible records go back only to 1350, the date of the foundation of Ayuthia, the old capital, on the Menam, about 60 miles above its mouth. In 1612 an English ship ascended this river as far as Ayuthia, eight years after which the Portuguese sent thither their first missionaries. In 1689 Constantine Phaulcon, an enterprising Greek, became Prime Minister, and introduced a respect for European customs and notions. Mutual embassies were at this period sent between Siam and the court of France, with which Phaulcon intrigued to bring about a revolution. This led to his downfall and death, as well as the expulsion of the French. Contests for the throne distracted the country from 1690 till 1759; during which interval Alompra, the victorious ruler of Burma, overran the whole valley of the Menam. The country was afterward wrested from the Burmese by Pye-ya-tak or Phyatak, who was of Chinese extraction, at the head of a number of natives. He planted himself on the throne and with a view to commerce made Bangkok the metropolis, instead of Ayuthia. Being a cruel ruler he was murdered by his general, Chakri, who himself seized the throne in 1782 and was the founder of the present reigning dynasty. Maha Mong-Kut, who ascended the throne in 1851 and died in 1868, was a man of science and energy. He was succeeded by King Chulalongkorn I, who died 23 Oct. 1910. The present king is Chowfa Maha Vajiravudh (b. 1881). Siam declared war on Germany and Austria on 22 July 1917 and seized all German vessels lying in Siamese harbors. All Germans and Austrians were arrested and their businesses closed.

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SIAM, Gulf of, East India, a large arm of the China Sea, bounded by the Malay Peninsula on the west, and by Siam and French Indo-China on the east. It is about 400 miles long and 250 miles wide, but very shallow, being nowhere more than 300 feet in depth. The large delta of the Mekong is steadily encroaching on its waters.

SIAMANG. See GIBBON.

SIAMESE (sī-ą-mēs' or mēz') **TWINS:** b. Bangesau, Siam, 15 April 1811; d. Mount Airy, N. C., 17 Jan. 1874. The name given to two individuals of Chinese extraction, named Chang and Eng, who from the manner of their physiological connection were regarded as examples of "anterior duplicity." They grew to be about five feet two inches in height, could walk, run and swim. In April 1829 they were brought to America and exhibited throughout the United States and later in Europe. They finally settled at Mount Airy and lived there until their death.

SIAN-FU, provincial capital of Shensi, N. W. China, often erroneously called Si-ngan-fu, Sin-gan-fu, Hsian-fu; formerly called Chang-an. Once the important capital of the Tang Dynasty. The city became famous through the discovery in 1625 near the western suburban gate of the "Nestorian Monument," dated 781, a two-ton limestone stela, 10 feet high, with an inscription of more than 2,000 characters in Chinese and Syriac (Estrangelo). The inscription tells of the arrival in 635 of Nestorian missionaries from Syria, who were well received by Emperor Taitsung. In 1907 the Danish explorer, Fritz von Holm, set out to try and procure the Tablet for science, but the mandarins at Sian-fu caused the stone to be removed into the Peilin or "Stone Coppice" inside the city walls where it would be safe and under roof. The Holm expedition thus preserved the stela for all ages, but it furthermore obtained a perfect limestone replica of the monument, 10 feet high and weighing two tons, which was brought to New York, where it was placed as a loan in the Metropolitan Museum of Art. "Chingchiaopi" is the Chinese name of the Tablet. Sian-fu was again the capital of China for nine months, in 1900–01, when the late emperor and empress-dowager fled thither from Peking during the Boxer troubles. The population is about 1,000,000.

SIARGAO, sē-är-gä'ō, an island of the Philippines, 20 miles from the northest coast of Mindanao; length, 20 miles, north and south; width, 14 miles; area, 176 square miles. It is traversed from north to south by a mountain range, the highest peaks of which are in the south. The northern, southern and western coasts are paralleled by a reef lying three miles off shore; the ports on the coast are reached by natural channels through this reef. The island has seven towns, several hamlets and a considerable rural popuation.

SIBALÓN, sē-bä-lōn', Philippines, pueblo, province of Antique, island of Panay, on the Sibalon River, six miles from its mouth, 10 miles northeast of San José de Buenavista. Pop. 11,680.

SIBBALD'S or BLUE WHALE. See WHALE.

SIBELIUS, sē-bā'lī-ŭs, **Jean,** Finnish composer: b. Tavastehus in the government of the same name, 8 Dec. 1865. He studied under Wegelius at Helsingfors, Becker at Berlin, and Goldmark and Fuchs at Vienna. Since 1893 he has been professor at the Institute of Helsingfors. His work as a composer has placed him at the head of living Finnish masters and he is regarded as a worthy successor of the greatest names in the history of Finnish music. He is regarded as the founder of Finnish national music and his work is singularly free from the influence of foreign composers. His compositions are strong, passionate, mystic and at times even weird and not easy of comprehension to those unacquainted with Finnish character and history. He is thoroughly imbued with the music of the native folk songs, and while he never definitely follows themes of the folk music he rarely strays away from its influence. Particularly is this noticeable in his use of five-four rhythm and of the repetition of single notes, both characteristic of the native music. Among his works are symphonies in E and in D; 'The Swan Song of Tuonela'; 'Suite Karelia'; 'Kuolema'; 'Suite Pelleas and Melisande'; the Finnish opera 'The Maid in the Tower'; Violin concerto in D, and many songs, symphonic poems, and pieces for piano and orchestra.

SIBERIA, sī-bē'rī-a, a vast district of Russia, east of the Ural Mountains and the Caspian Sea, extending uninterruptedly from the Urals eastward across 130° of the meridian to the Pacific Ocean, thus occupying the whole of northern Asia above lat. 50° N., lying mainly between 46° and 78° N. lat. and 60° and 190° E. long. Siberia is bounded on the north by the Arctic Ocean; on the east by the Bering Strait, North Pacific Ocean, Sea of Okhotsk and the Sea of Japan; on the west by the Ural Mountains and European Russia; and on the south by an irregular frontier line of over 6,000 miles separating it from Persia, Afghanistan and the Chinese territories. Siberia stretches from Orsk for over 4,200 miles northeastward to Cape Vostochni on Bering Strait, and from Cape Severo (Chelyuskin) for about 2,000 miles southward to the Tarbagatai range, with a total area estimated at 4,831,882 square miles, and a population of close on 11,000,000. In superficial area — according to these figures — Siberia has 1,214,209 square miles more than the United States and 1,031,882 square miles more than Europe. Since the extension of the Russian dominions in central Asia a territorial division called Central Asia has been formed partly taken from what was formerly Siberia, partly formed of newly-acquired territory, and comprising the geographical regions subdivided into provinces, of northern Caucasia and Trans-Caucasia, forming the Caucasus; area, 181,173 square miles, with a population of nearly 13,000,000; the four provinces of the Steppes, with an area of 710,905 square miles and a population of nearly 4,000,000; and the four provinces of Turkestan, area, 420,807 suqare miles, population, 6,613,600, and, finally, the Trans-Caspian provinces, area, 235,120 square miles, population, 535,000. Some authorities give the area of Trans-Caspia as 214,237 square miles. The total area of Asiatic Russia is approximately 6,294,120 square miles, with a population of about 28,500,000. Siberia, strictly so-called, is, therefore, of much smaller extent than formerly. The administrative divisions of the whole territory, with their separate population, are exhibited in the table given under Russia (q.v.).

Topography.— So vast a region is naturally of very diversified configuration. Whereas the southwestern part is entirely lowland, the southern and eastern portions comprise considerable highland tracts. The coast line (19,300 miles) is very extensive, but the Arctic Ocean is ice-bound at least 10 months out of the 12 and is almost valueless for commercial purposes, while the Sea of Okhotsk, on the Pacific, is infested with masses of floating ice and dense fogs during several months of the year. Asiatic Russia in the extreme southwest is partly below the level of the ocean, and is drained either into the Caspian, or by the Amu Daria and Sir Daria into the Aral. A large part of this region is desert, and the soil is frequently impregnated with salt. Taking the meridian of 105° as a line of demarcation, two regions will be formed — a western and an eastern, exhibiting a very marked difference in the configuration of their surface. Both regions have their greatest altitude in the south, and may be considered as a vast inclined plane, sloping gradually north to the Arctic Ocean; but the eastern region is traversed in different directions by several mountain regions, whereas the western region, with the exception of the chain of the Ural on the western, and that of the Altaï on the southern frontiers, forms a vast plain, almost unbroken by any greater heights than a few hills and the banks of the rivers which wind across it. This plain, toward the south, has a height of about 2,000 feet above the sea, but toward the north is so near its level as often to become extensively inundated. For convenience of description it has been arranged, according to its productive powers, in four divisions—the steppe or pastoral, the agricultural, the woody, and the moorland or tundra. The steppe, occupying the most elevated part of the plain, extends from the southern frontiers north to lat. 55°; and from the western frontiers, within these limits, east to the banks of the Irtish. The greater part of it consists of what is called the Steppe of Ishim, and has a bare and almost sterile surface, often incrusted with salt, but also occasionally covered with a scanty vegetation. The agricultural division extends northward to about lat. 60°. In many parts, where it borders on the steppe, it has much of the same character, and has only occasional tracts which have been or can be advantageously brought under the plow; and in many other parts primeval forests are often found. The division thus named under favorable circumstances might furnish subsistence to a very large population; but as yet it is only the more fertile alluvial tracts adjacent to the rivers that have been brought under anything like regular culture. Within this division, though not properly belonging to it, is the Steppe of Baraba, situated between the Irtish and the Obi. It has a more abundant vegetation than the Steppe of Ishim, which it otherwise resembles, and in its northern portion is covered with nearly continuous forests of birch and fir, haunted by numerous wild animals, including the beaver. From this the wooded division extends northward to lat. 64°, and in parts to 66°, though in the higher latitude the trees are seldom of very vigorous growth. The whole of this division is covered with vast forests of birch and different species of fir and pine. The population, few in numbers, are settled chiefly on the banks of the Obi and Yenisei, and live mainly on game and fish; the latter, including salmon, sturgeon and herrings, ascending from the sea as far as the confluence of the Tom. Wild animals also are very numerous, and many valuable furs are obtained. The last division is that of the moorland or tundra, consisting of a low monotonous flat covered with moss, and nearly destitute of trees. It extends along the shores of the Arctic Ocean, and has so rigorous a climate that even in summer ice is found a few inches below the surface. Here the reindeer exists in vast herds, both wild and domesticated; white bears and foxes are also numerous and furnish valuable furs; and the

coasts and mouths of the rivers are frequented by immense shoals of fish and flocks of fowl.

Siberia to the east of long. 105°, forming nearly one-half of the whole territory, has a much more diversified surface than the western region, and owing partly to its general ruggedness and elevation, and partly to the greater severity of its climate, has much less land adapted for agricultural purposes. The Sea of Okhotsk has a bold and rocky shore, and the country behind rises with a steep ascent till a mountain-range is formed, with a general altitude of nearly 3,000 feet above sea-level. This range, under the name of the Stanovoi Mountains, runs nearly parallel with the coast till it reaches the frontiers of China, where it takes the name of the Jablonnoi Mountains, and proceeding west continues for a long distance to form the boundary between the two empires. It then takes the name of the Mountains of Daouria, and throws out numerous ramifications, which, continuing west, throw their arms round Lake Baikal, and cover almost all the south part of the government of Irkutsk. Other ramifications, proceeding north, form the watersheds of the numerous affluents of the right bank of the Lena. On both sides of this river the surface continues elevated, and forms a table-land, the interior of which is still very imperfectly known. The best portions of eastern Siberia occur in the south of the government of Irkutsk, where, in the lower and more open valleys in the vicinity of Lake Baikal, cultivation has been attempted with success, and the oak and hazel, unknown in other parts of Siberia, are found growing freely. In almost the whole of the same government, where the configuration of the surface does not present invincible obstacles, all the grains of Europe are grown, and even the mountains and hills are covered during the greater part of the year with good pasture. Still farther north, in the government of Yakutsk, as far as the town of same name, corn is cultivated in patches in the upper vale of the Lena, though the far greater part of it is covered with fir and pine. The north part of eastern Siberia consists of two distinct portions, the one extending from long. 105° E. to the lower valley of the Lena, and the other from that valley east to Bering Sea. The former portion is imperfectly known: the latter, as far as the Kolyma, is traversed from north to south by chains of low hills, separated from each other by wide valleys or open plains, and generally overgrown with stunted larch and birch. In these valleys and plains are numerous lakes, generally well supplied with fish, and bordered by low banks, on which a rich grassy sward is often seen. To the east of the Kolyma branches from the Stanovoi Mountains stretch north, and form a series of ranges which frequently rise from 2,000 feet to 3,000 feet. Some of these penetrate to the north coast, and are seen forming precipitous cliffs at Shelagskoi Nos, Cape North, and other headlands. Other ramifications from the Stanovoi pursue an opposite course, and traverse the remarkable peninsular of Kamchatka almost centrally to its southern extremity.

Hydrography.— The rivers are numerous and of great magnitude. From the configuration of the country they almost all flow in a northerly direction, and belong to the basin of the Arctic Ocean. The chief exceptions are the Anadir and the affluents of the Amur in the east, and the Sir Daria, Amu Daria and other streams in the southwest. The great rivers belonging to the basin of the Arctic Ocean flow for the most part through immense tracts of level country, and hence are remarkable at once for the length of their course, the volume of water which they accumulate from numerous and important affluents, and the few obstacles which they present to a continuous navigation, but these advantages are diminished by the long period during which they are frozen over; though even then they do not cease to be available for traffic, and become, in fact, the great highways of the country. The Obi is one of the largest rivers of the Old World; the length of its course is 2,400 miles, and the area of its basin is 1,224,435 square miles. Among its important affluents, many of them so large as to be entitled to rank as magnificent rivers, are the Irtish, Ishim and Tobol, which, by uniting their streams, more than double its volume; the Tom, Tchulin and Ket. The estuary of the Obi forms a gulf from 70 miles to 80 miles wide, and about 400 miles long. Large quantities of fish are taken in this river and its tributaries. The Yenisei, the second river in importance, draws its waters from an area of not less than 1,020,000 square miles. It rises in Northern Mongolia and flows north a distance of over 2,000 miles to the Arctic Ocean. Its most important affluents are the Selenga, which, before entering Lake Baikal, drains an area of more than 140,000 square miles; the Angara, which receives the discharge of the lake, and in the lower part of its course takes the name of Upper Tunguska; the Middle Tunguska, and the Lower Tunguska. The estuary of the Yenisei is about 20 miles wide, and 200 miles long. The Lena has a course of about 2,000 miles, and drains an area of about 800,000 square miles. It rises hardly 20 miles to the west of Lake Baikal, and becomes navigable at 50 miles from its source. Its principal affluents are the Vitim, which has a course of 700 miles, of which a considerable part is navigable; the Olekma, which flows 500 miles through interminable forests; the Aldan, which drains an extensive tract of table-land between long. 125° and 140° E.; and the Viliui, which rises in a mountainous district not far from the Lower Tunguska, and flows west for about 600 miles. The most important of the minor rivers which send their waters directly to the Arctic Ocean are the Olenek, between the Yenisei and Lena; and to the east of the latter, the Indighirka and Kolyma. The only important lakes are those of Baikal, 400 miles long and in places 50 miles wide; the Sea of Aral, and Balkash-Nor or Tenghiz, in the southwest. Numerous other lakes are scattered over the surface, and more especially in the tundras, where whole chains of them, covering extensive tracts, not infrequently occur.

Geology and Minerals.— Granite and crystal-line schists are found chiefly on the eastern slopes of the Ural Mountains, in the south among the mountain-ranges of the Altai as far north as lat. 57° N., and between long. 85° and 120° E., chiefly in the governments of Tomsk and Irkutsk, on both sides of the Upper Tunguska and east of the Yenisei; in the upper part

SIBERIA

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of the basin of the Middle Tunguska; and in the very eastern extremity of the country, from long. 165° to the shores of Bering Strait. The volcanic rocks belong mostly to the Tertiary period, and are found chiefly in the south, in connection with the granite and crystalline schists above described. They compose the great mass of the mountain-range which skirts the western shores of Lake Baikal, and are seen in a still more magnificent and interesting form in the mountains which proceed from north to south, nearly through the centre of the Peninsula of Kamchatka, where are several active volcanoes. Palæozoic rocks, including the rocks belonging partly to the Silurian, partly to the Devonian, and partly to the Carboniferous systems, are developed chiefly in the south, where they occupy a large space in the form of a triangle, the apex of which is at the town of Irkutsk, and the base on the parallel of 60°, between long. 85° and 120° E. Another large development of the same rocks is seen on the northwest and north of the Sea of Okhotsk, and to a considerable distance inland. Secondary rocks higher in the series than the Carboniferous system commence near the northern shores of Lake Tenghiz, and stretch northward, occupying a considerable tract on both sides of the upper valley of the Irtish; a more partial development of the same rocks is seen on the north of the Obi, commencing near the confluence of the Ket, and extending north in a comparatively narrow belt to the sources of the Taz. The most extensive formation in Siberia is the Tertiary, which stretches almost continuously from the last slopes of the Ural Mountains east across the Obi to the valley of the Yenisei; and in other quarters, though more intermingled with earlier formations, covers no inconsiderable portion of the whole surface. The shores of the Arctic Ocean, almost throughout their whole extent, and to a considerable distance inland, have a deep alluvial covering, remarkable for containing deposits of fossil elephants and other animals in such quantities that the ivory obtained from them forms an important article of commerce. The minerals of Siberia are evidently of immense value, and though the real extent of surface on which they are found is as yet only roughly guessed at, there cannot be a doubt that the most precious of all the metals exists there in greater abundance than in any other part of the Old World. Till recently the auriferous deposits were supposed to be almost confined to the eastern slopes of the Ural Mountains, and to occupy a zone extending over from 5° to 6° of latitude to the north and south of Ekaterinburg; but it has been discovered that some of the eastern regions, particularly in the governments of Tomsk and Yeniseisk, are highly auriferous, and that a tract larger in area than the whole of France contains gold, not in its alluvia, but in the very matrix of its rocks of palæozoic schists and limestones, which, when pounded and analyzed, are found to be more or less impregnated with gold. The principal mining districts are those of the Ural already mentioned, the Altaï and Nertchinsk, in the basin of the Amur. Besides gold, iron, copper, silver, platinum, lead, tin and zinc are found in greater or less abundance. The other notable minerals of Siberia are the emerald and topaz, of which there are celebrated mines at Nertchinsk; salt, found in natural crystals on the banks of lakes, chiefly in the steppes of Ishim and Baraba; jasper and porphyry of great beauty, quarried especially in the valley of the Charysh among the Altaï Mountains; lapis-lazuli, found among the mountains in the vicinity of Lake Baikal; diamonds, found occasionally on the eastern slopes of the Ural Mountains; malachite, obtained in greater or less quantity from all the mining districts, containing copper; and mica, in the form of large plates, extensively used as a substitute for glass, and found in greatest abundance on the banks of the Vitim.

Climate.— This country is remarkable for its rigor. The isothermal line which skirts the southern coast of Iceland, in proceeding east, descends rapidly till it reaches Petrograd, and then more gradually till it reaches long. 100° E., where it is found in lat. 52°. From this it proceeds nearly due east, passing through the southern part of Lake Baikal, the town of Nertchinsk, and the southern extremity of Kamchatka. It thus appears that the southern coast of Iceland, in lat. 63°, has the same mean temperature as eastern Siberia in lat. 52°; in other words, that in proceeding from west to east the cold increases so much as to make places in the same latitude as Berlin to have a climate nearly as cold as Iceland. In the same manner the line of permanent ground-frost descends in parts of Siberia as far south as lat. 56°, nearly the same as that of Edinburgh; and over the whole country to the east of the Ural Mountains is as low as lat. 60°. Erman found that annually between 17 December and 18 February, and most frequently in the first three weeks of January, cold is experienced exceeding 90° F. below the freezing-point; and that for two entire months, or one-sixth part of the whole year, mercury is a solid body. This extreme winter is succeeded by an exceedingly warm summer. Thaw usually commences on the 1st of April, and the temperature increases rapidly till it attains its maximum in July. In this month the average height of the thermometer is about 66° F., but it not unfrequently rises in the shade above 77°. In Yakutsk, where the cold is severest, notwithstanding its long and extreme winter, there are 128 days in the year without frost; and within that period several kinds of grain, not excluding wheat, have time to attain maturity; and in rich alluvial soils often produce a return of fifteenfold.

Manufactures and Commerce.— The manufactures are limited, and are confined for the most part to a few of the larger towns, where government factories have been established. The more important articles are leather, earthenware, porcelain, glass and hardware. In some places, as at Telma, large woolen and linen factories employ a considerable number of hands, chiefly exiles, in weaving woolen and linen cloth, and in conducting all the previous processes of preparing the wool, flax, etc. The trade is of considerable extent; and in so far as confined to the produce of the country consists chiefly of cattle, fish, caviar, furs, skins and metals. A very important transit trade is also carried on across the country between Russia in Europe and China. From the latter part by far the most important article is tea, both in the dried leaf and in the form of cakes

or bricks. The greater part of the latter is disposed of to the nomadic tribes, and a very large proportion of the former never passes beyond the limits of Siberia, but is retained for home consumption. Other articles of importance from China are coarse cotton stuffs, rhubarb, silks, satins, etc. The chief mart for this trade is the town of Kiachta, and extensive fairs are held at various places. For the interior traffic the rivers naturally furnish the most important conveyance; but when these become closed with ice other means of conveyance must be resorted to, among which the most characteristic is that of sledges drawn by reindeer or dogs. Great impetus has been given to commerce and colonization generally throughout the region, by the completion of the railway, the longest in the world, connecting the far Orient with Europe. (See TRANS-SIBERIAN RAILWAY). The length of railways throughout Asiatic Russia in 1913 was 10,586 miles. A trade by sea has also been opened up between Europe and the rivers Obi and Yenisei.

Ethnology.— The races and tribes scattered over the different parts of Siberia are so numerous that little more can be done here than to give the names of the more important. The earliest inhabitants were probably the Yeniseians, who were followed by the Ugro-Samoyedes; these in their turn were driven out by Turkish tribes, who were ousted by the Mongols in the 13th century. To-day at least two-thirds of the whole population is Russian, and consists either of voluntary emigrants, who have found it to their interest to settle in the country, or of exiles and their descendants. In regard to the exiles Siberia is merely a penal sttlement, and hence that portion of the population which, as coming from Europe, ought to be the most civilized, is not likely to be the most exemplary. A more unsophisticated, and far more interesting, population is furnished by the indigenous tribes. Beginning at the Ural Mountains and proceeding eastward we find the Samoyedes in the northwest. Immediately south of these the Ostiaks occupy both sides of the Obi, up to the confluence of the Irtish, the northern part of the steppe of Baraba, and the whole of the woody region eastward to the banks of the Yenisei. They live by fishing and hunting, and though their physical structure is by no means robust they display both great dexterity and courage in attacking the larger and fiercer animals, both of the land and water. Some of them have embraced Christianity, but the great majority continue addicted to Shamanism. In the south, among the Altaï Mountains, the Kalmucks predominate, but have laid aside a number of the usual peculiarities of their race. They subsist chiefly on the produce of their horses, cattle and sheep, and cultivate a little grain and tobacco. They have some skill in mechanical arts, particularly in the working of iron, and make their own gunpowder. Though not Buddhists they are generally addicted to other forms of superstition. Among the eastern slopes of the Altaï are several Turkish tribes. The Buriats dwell chiefly on both sides of Lake Biakal, and eastward as far as the Onon. They are of Mongol origin, and closely allied to the natives of the northern provinces of China both in language and customs. The Tunguzes or Toongooses are the most widely dispersed of all the native tribes, being found throughout many parts of Siberia from the Arctic shores to the frontiers of China. They are considered the best-formed of the native Siberians, are very expert horsemen, and live chiefly by hunting. The Yakuts live intermingled with the Tunguzes, and confine themselves almost entirely to the rearing of horses and cattle, and the preparation of dairy produce from them. They are of Tartar origin, and not a few of them are nominal converts to Christianity, though the majority, like the Tunguzes, still adhere to Shamanism. The Tchuktches occupy the northeastern portion of Siberia, and their language proves them to have a common origin with the Eskimos. Some of them spend their time in hunting and fishing, while others are nomadic in their habits. Interesting and valuable information on these tribes was collected by the Morris K. Jesup Expedition which returned to the United States in 1904.

History.— Siberia appears to have been partly conquered by Genghis-Khan and his successors, but did not become known to Europe till 1580, when a Cossack called Yermak Timofeyew, who had long robbed the vessels which navigated the Volga, finding himself hotly pressed by the Tsar of Moscow, crossed over into Asia with his accomplices. Their number sufficed to form a small army, and their courage soon enabled them to acquire extensive settlements. These Yermak offered to the tsar on the condition of obtaining pardon. The offer was accepted, and thus Russia for the first time obtained a footing in Asia. The territories thus conquered belonged to the Tartar prince Kutshum-Khan, and included his residence, which, called by the natives Isker, and by the Cossacks Sibir, has given name to the whole country. The conquests of Yermak were gradually extended, till the whole country west of the Obi was subjected to the tsar. In 1604 the town of Tomsk was founded, and became a centre from which new expeditions were fitted out and new conquests made. Private adventurers, instigated chiefly by the hope of plunder, proceeded in all directions to the south, where, not without serious reverses, they succeeded in expelling the Kirghiz; and to the east, where they entered the basin of the Lena, subdued the Yakuts, and finally, after passing the Aldan Mountains, reached the Sea of Okhotsk. In the neighborhood of Lake Baikal a formidable resistance was made by the Buriats, but their subjugation was finally completed in 1658. The town of Nertchinsk, which has since become so celebrated for its mines, was then founded, and, two years after, that of Irkutsk. A further extension of conquests to the south brought the adventurers into collision with the Chinese, and both governments taking part in the quarrel, a war, threatening the existence of one or other of the empires, became imminent. It was, however, prevented, partly by the intervention of the Jesuits resident at Peking, and a treaty in 1689 definitely fixed the boundaries of the two empires. A second treaty in 1727, confirming the former, regulated the commercial intercourse and confined it to the two localities of Kiachta and Maimachen. Never has so large a territory been acquired at so little expense. Russia, almost without any expenditure of her own means, and chiefly by the aid of a few Cossack adventurers, in little more than a century more than doubled her area. The greater part of it indeed is a frozen inhospitable region, which must always remain comparatively worthless; but vast tracts possess a climate and soil well adapted for agriculture, and seem destined to become the abodes of a dense population engaged in agriculture, mines and fisheries.

With the building of the Trans-Siberian Railway (1891–99) emigration from Russia to Siberia became easier and was patronized by the government. Whereas in former times the annual influx of new settlers was from 20,000 to 30,000, with the opening of the railway it rose at once to from 150,000 to 200,000. During the Russo-Japanese War it was interrupted, but many Russian peasants who had been called up for military service then first made acquaintance with Siberia. No sooner was the war over than the wave of emigration rose to an unprecedented height. In 1907 the number amounted to 576,979; in 1908 there were 758,812; in 1909 there were 707,463. Since then emigration has again declined, maintaining an average of 300,000 per year. The advent of labor and money, and the establishment of new farms has transformed all the old conditions of the country. Even the nomad Kirghiz have been aroused from their lethargy by the gradual narrowing of pastures and have taken to plows and reaping-machines. New towns have arisen in Siberia, new industries have started; the Zemstov system was introduced in 1905, while a uniform system of public justice — in place of the existing arbitrary administration of autocratic officials — was instituted in 1897 by order of the ex-Tsar Nicholas. Trial by jury was not conceded but the justices were appointed by the Crown. The higher tribunals consist of eight circuit courts in the towns of Tomsk, Tobolsk, Chita, Krasnoyarsk, Irkutsk, Yakutsk, Blagovestchensk and Vladivostok, with a court of appeal above these stationed at the capital, Irkutsk (pop. 109,000). A sea route through the Kara Sea to Siberia has in recent years been opened up, chiefly by British enterprise.

Siberia has an unenviable record owing to its famous convict settlements. It was in 1710 that Peter the Great first began exiling inconvenient political opponents to the bleak steppes beyond the Urals but it was not till the first quarter of the 19th century that it became a common practice to deport criminals to Siberia in addition to political offenders. In later years a stream of emigration was directed thither and encouraged. While those prisoners who were regarded as dangerous were chained and forced to work in lead mines, those accused of minor offenses (who were frequently accompanied by their families and friends) were permitted to live in comparative freedom, running stores and workshops on their own account. Some European visitors have even brought back stories of female political exiles who had their own pianos and read the latest French novels. The squalid horrors of the convict system are described in numerous travel books and especially in Russian fiction.

The tangled skein of events that developed in Siberia between the period of the Russian Revolution in March 1917 and the summer of 1919 presents a confusing panorama, of which it is only possible as yet to give a more or less approximate description. In a sense the Siberian imbroglio of 1918–19 was not so much a part of the Great War as a side issue that arose from it and from the Revolution. It may better be described as a civil war accompanied by half-hearted experiments in foreign intervention. Beginning as a struggle in favor of the Allies after the military collapse of Russia, it developed into a far-flung campaign against Bolshevik rule. In the early stages of the European War whole regiments of conscript Slavs — Czechs, Slovaks, Croats and Poles — in the Austro-Hungarian army deserted over to the Russian side. Though living under foreign dominion for centuries, these races had clung tenaciously to their national culture and languages. Their sympathies in the war lay with their Slavic kinsmen in Russia as against the Central Powers. Out of these deserters a Czecho-Slovak division had been formed after the Revolution and incorporated with the Russian army. It played a gallant part in the last offensive that Brussilov was able to direct against Austria before Bolshevism succeeded in demoralizing the Russian troops and navy. The Czecho-Slovaks, however, insisted on continuing the war, and demanded to be sent to France to join the Allies. The Bolshevik rulers were willing that they should leave Russia, and in February 1918 they were granted a passage to Vladivostok; but before their removal could be effected Trotzky had concluded the Brest-Litovsk Treaty with Germany (3 March 1918) and the bulk of the Czecho-Slovaks, some 50,000 at that time in the Ukraine, found themselves in danger of falling into German hands. Refusing to make peace and unable to face the German advance, they decided (after rejecting Austrian overtures to return home and be forgiven), to retreat over the railroad to Moscow and make their way thence across Siberia, across the Pacific Ocean and America to France. Hunted by the Germans, they fought a four days' battle at Bakhmach, 125 miles northeast of Kiev, defeating them severely. Under tremendous difficulties they continued their amazing journey eastward; they cut their way through and, to prove their loyalty to the government then in being, surrendered most of their equipment to the Bolsheviki, leaving also hundreds of automobiles and air planes to the Germans. Though betrayed time and again by Bolshevik treachery, their wounded murdered, attacked daily by Red Guards and Austro-German prisoners led by German agents, they at first steadfastly refused to fight against Russians and to interfere in Russian politics. After 56 days' of toil and hardships, the vanguard of this modern "Ten Thousand" completed its "Anabasis" and reached the Pacific — one of the greatest military achievements in history. Other detachments of Czecho-Slovaks remained in western Siberia and on the road to Archangel.

On 14 March 1918, Mr. A. J. Balfour pleaded in the House of Commons for Allied assistance in Siberia against the growing menace of German penetration owing to the presence of some 94,000 Austro-German prisoners of war east of Lake Baikal, and 60,000 to the west of the lake. He strongly defended the loyalty of Japan to her allies and suggested that that country should be invited to intervene "as

friends of Russia and enemies of Germany, to preserve the country from German domination." The Japanese Foreign Minister, Baron Goto, stated on 1 May that "Japan must give encouragement, assistance and support to the work of reorganization" in Russia and "preserve peace in the Far East." Negotiations were progressing between the Allied Powers on the thorny problem of intervention in Siberia.

To return to the Czecho-Slovaks. The Bolsheviki had promised them a "safe conduct" and transportation, neither of which materialized. Acting under German pressure, Trotsky ordered them to be disarmed. This was forcibly attempted in May, when the Czechs resisted and attacked the Bolshevik troops both in Europe and in Siberia, captured several towns on the Volga during June, occupied Samara and advanced to Ufa in the Ural region. They seized control of the principal grain routes, thereby cutting off the food supply from Siberia. Scattering the Bolsheviki before them, they fought their way along the Siberian Railway, and by July were in possession of the line from Chelyabinsk in the Urals to Krasnoyarsk, a distance of over 1,300 miles. Meanwhile, a large contingent of Czecho-Slovaks had arrived in Vladivostok, the eastern terminus, from which point they began operating westward to effect a junction with their comrades. The Bolsheviki were driven out of Vladivostok and Irkutsk by the end of June. The Czechs entered the Amur region and occupied several towns, and by the middle of July nearly the whole Trans-Siberian Railway was in their hands. In each of the towns at which they arrived they found a Soviet local government of Workmen's and Soldiers' Delegates, in other words, Bolshevik rule. Each of these was immediately overthrown, at which task the Moderate Russians or anti-Bolshevists heartily assisted.

After the Bolsheviki had dispersed (in November 1917) the Constituent Assembly in Moscow, many of the members made their way into Siberia, where they secretly maintained their organization under the Red rule. The coming of the Czechs gave this group their chance. Its members established the Temporary Siberian government at Omsk on the ruins of Bolshevism in central Siberia in June and began to organize a Russian anti-Bolshevist army. Other governments sprang into existence later on: General Horvath, director of the Chinese-Eastern Railway, established a provisional government at Harbin; General Semënov founded one in Chita, and Avksentiev created the Ufa Convention, while yet another Siberian government arose at Novo-Nikolayevsk in western Siberia. A branch of the Omsk government was set up in Vladivostok. Before long trouble arose between this multitude of "independent governments," each claiming either "All Russia" or "All Siberia" as within its jurisdiction. Allied influence was exerted to settle the local rivalries. By arrangement the Ufa Convention was dissolved and merged in the Omsk government, under a directorate of five members: Avksentiev, Vinogradov and Vologodsky (Socialists), Astrov (Cadet), and General Boldereff (non-party), as commander-in-chief. Admiral Kolchak was appointed Minister for War and Marine; 10 other ministerial posts were created, for Foreign Affairs, Interior, Finance, Justice, Communications, Munitions, Labor, Commerce, Supplies and Education. Political intrigue soon made its appearance among the central committee which threatened to lead to confusion and disintegration when the council of ministers decided to take the authority of the Directorate into its own hands. Soon after his appointment Admiral Kolchak proceeded to the front on a tour of inspection. Just at that time the Czech commander had invited the British 25th Middlesex Battalion to attend the presentation of colors to the Czech regiments at Ekaterinburg in the Urals, and Col. John Ward, an English Labor member of Parliament, had accepted for the band and 100 men of his battalion. Railway traveling being a difficulty in Siberia, the admiral's carriage was attached to the British troop train, and Colonel Ward offered his men as the admiral's escort for the whole trip around the front. Thus it happened that the Russian War Minister inspected his troops with no other guards than British soldiers, who duly accompanied him to the front and marched up to the outpost line with the band playing 'Tipperary.' The tour ended abruptly at Chelyabinsk; instead of going west to Ufa according to program, the admiral and his escort suddenly turned east at top speed for Omsk. On the road they encountered a special train bearing General Boldereff, who held a long private consultation with Kolchak. On the morning of 17 Nov. 1918 they were back in Omsk, and that same night Avksentiev, two other members and the chief of police mysteriously disappeared. Next morning the streets were alive with troops. A batch of officers had spirited the administrators away during the night. There was little doubt that the military party meant shooting. Colonel Ward immediately wrote a bluntly-worded letter to the admiral intimating that British public opinion would regard with profound disapproval any attempt to deal with the arrested men except by proper trial. Kolchak at once gave the required assurances, and two days later the four men were entrained for China under a joint British and Russian guard, and with the train flying the British flag as a precaution. With Boldereff perspicaciously absent and the extreme Socialists arrested there remained but two of the Directorate, Vologodsky and Vinogradov, who promptly resigned their offices and the Directorate became extinct. The council had now to decide whether to retain power itself, which virtually meant a resuscitation of the Siberian government, or to vest it in something or somebody else. The whole procedure was no doubt cut and dried in advance. The council formally assumed the power, fallen upon it by the disappearance of the Directorate, and immediately offered it to Kolchak with the title of "Verkhovnü Pravitel" (Supreme Administrator), virtually dictator. Kolchak accepted, thereby completing the *coup d'état*.

Already in April 1918 some British and Japanese marines had been landed at Vladivostok to maintain order. A Chino-Japanese agreement (16 May) assured the co-operation of China to combat German penetration in Siberia. Early in August a small British force landed at Vladivostok to co-operate with an American detachment and a larger Japanese force; active intervention had been decided upon after lengthy negotiations between the Allied Powers. Declarations were formally made by the American and Japanese governments that the movement of Allied troops into Siberia was not an act of hostility against the Russian people, but an intention to assist them. The Allied force was placed under the command of the Japanese General Otani; besides those already mentioned, his force consisted of French, Italian, Serbian and Rumanian units. Maj.-Gen. W. S. Graves was in command of the American contingent, consisting of two regiments from the Philippines. A British plenipotentiary for Siberia was sent from Hongkong. The Bolshevik government declared the Allied intervention in Siberia to be an act of war against Russia while the Moderates welcomed it as the only feasible measure to crush Bolshevism and to disabuse the Germans of the idea that the road eastward lay open to them. In the fighting along the Siberian line the Czechs and the Russian White Guards gained numerous successes over the Bolshevist forces. In the Far East, however, the operations of the Allied armies did not for some time extend beyond the Amur and Ussuri province north of Vladivostok. By the middle of August 1918 the situation became complicated. The Czechs held the line from the Urals to Irkutsk; the Allies controlled part of the Ussuri region. Between the two lay a formidable army of Bolsheviki and former Austro-German war prisoners, all well equipped and led mainly by German officers. Other detachments of Czechs, still further west in Russia itself, were hard pressed, while neither the British from the Murmansk expedition nor small forces operating from India up through the Caucasus and Transcaspia, were near enough or strong enough to effect a junction. Even in Ussuri the Czechs were in peril until the Allies and a Cossack force under Semënov were able to reach them. The Japanese captured Khabarovsk (8 Sept. 1918), the base on the Ussuri Railroad of the Siberian Bolsheviki, who then withdrew to Blagoveshtchensk. They were cleared from the railway between Lake Baikal and Manchuria and communication was finally established with the Czechs to the west, though it was for some time impossible to relieve the pressure against them. The Bolshevik army indeed grew ever stronger. Americans and Japanese captured Blagoveshtchensk (14,000 prisoners) and Alexeievsk on 18 September, when 2,000 Austro-Germans surrendered. Most of the fighting, however, was done by the Czechs and Slovaks. A deep and powerful motive lay behind their heroic exploits. Uninterested in Russian internal affairs, they were goaded into opposing the Bolsheviki when the latter openly proclaimed themselves their enemies. They had no desire to upset one Russian régime for another. Their sole aim was the defeat of the Central Powers and the creation of a free and independent Czecho-Slovak state — to liberate their own country. Wherever they appeared the Bolsheviki fled before them and the populations greeted them as friends and liberators, joining them and re-establishing order. The Allied contribution in men was small and the area of their operations was limited.

During August 1917 Siberia had received the most distinguished prisoners recorded in its annals when the deposed tsar, Nicholas II, and his family arrived at Tobolsk, nearly 2,000 miles east of Petrograd. About April 1918 they were removed to the Crimea, and subsequently to Ekaterinburg, the capital of the Red Ural, on the eastern slope of the Ural Mountains. That town, which is strongly fortified, is the key to Siberia, through which the great railway enters Siberia, and here the Omsk government had decided to establish the base for their operations against the Bolsheviki. The Ural Regional (Bolshevik) Council in Ekaterinburg was seriously threatened early in July 1918 by the approach of Czecho-Slovak forces. At the same time an alleged conspiracy to rescue the tsar was reported to have been discovered. "In view of this fact," a Russian official wireless announced, "the Presidium of the Ural Regional Council decided to shoot the ex-Tsar, Nicholas Romanoff. This decision was carried out on July 16." The Czechs occupied Ekaterinburg a few weeks later.

A Russian army was being raised by the Omsk government in the autumn of 1918 under General Gaida (a Czech) and organized by General Diederichs (a Russian). This force, the "White Guards," elected its own officers and was permeated with indiscipline. Furthermore, there was a general lack of confidence in the purpose of the Allies to defend Siberia. Confusion soon arose over the question of authority. German and Bolshevist agents were busy in all Siberian towns. No measures to secure public safety were undertaken owing to lack of co-operations between Russians and Czechs. American, British, French, Japanese and Italian troops were now penetrating Siberia proper from the east. On the night of 16 Oct. 1918 the first *échelon* of the Allied contingent steamed into the station at Zema, in central Siberia, when the train engineer was immediately held up by armed men and threatened with death if he did not vacate his post and join a strike which had just begun. Colonel John Ward commanded the British force. He instantly took over control of the station, marched a detachment into the town, surrounded the house of the strike leader and arrested him. A proclamation was put up declaring that any workman absent from his post next day would be court-martialed. The troops occupied all the workshops and public buildings during the night, and next morning the strike was over. Armed Bolsheviki surrendered their weapons under penalty of death. This resolute action frustrated a deliberate plan to stop the westward transport of Allied troops. A continuous stream of refugees from Russia poured into Siberia in search of food, drifting into crowded towns in a deplorable state of destitution. Sporadic fighting continued to the end of the year. In January 1919 an agreement was arrived at in Tokio for joint Allied control of the Siberian and Chinese Eastern railways, to restore the efficiency of those lines by a committee of American, British, French, Japanese, Italian and Chinese representatives under the presidency of a Russian. About the same time the question of command was settled. Admiral Kolchak was to remain dictator and nominal commander-in-chief and the French General

Janin was given supreme control of the operations against the Bolsheviki. The British General Knox was placed in command of the rear. Labor troubles, mainly due to delayed payment of wages, led to numerous strikes throughout Siberia, hampering both administrative and military activity. Colonel Ward was sent on a mission of investigation from town to town and to address the workmen, Kolchak promising to support any ameliorative measures proposed.

After the armistice with Germany (11 Nov. 1918) public interest in Siberia waned; opposition grew in America and Great Britain against maintaining troops in Russia. Public opinion in Canada agitated for the return of Canadian troops, of whom about 5,000 were stationed at Vladivostok, but had not been in action against the Bolsheviki. In February these were ordered to be sent home in the spring. Many Czechs, Slovaks and Poles were recalled by their new governments. The Japanese force in Siberia numbered about 73,400 men; of these, about 14,000 were withdrawn at the end of 1918; some 34,000 more were withdrawn during January and February 1919, leaving about 25,000. This reduction was the result of diplomatic representations by the United States government that Japan had sent a contingent in excess of the strength provided for by the inter-Allied agreement, which stipulated a force not exceeding 7,000 men for each of the associated powers. The following figures of the Allied forces that had been co-operating in Siberia were announced in the French Chamber on 26 March 1919 by M. Pichon, Foreign Minister; Czecho-Slovaks, 55,000; Japanese, 28,000; Poles, 12,000; Americans, 7,500; Serbs and Rumanians, each 4,000; Canadians, 4,000; Italians, 2,000; British, 1,600; French, 760: a total of 118,760 men, plus about 92,000 Russians.

During January the Russo-Czech forces lost the city of Ufa and Orenburg to the Bolsheviki, but made some gains at Tobolsk, Sarapol and Kungur. The Siberian army began an offensive against the Ural front early in March 1919 and captured the towns of Okhansk and Ossa, both southwest of Perm, and Birsk, north of Ufa. On the 16th the Bolshevist *Military Bulletin* reported, "Our troops have evacuated Ufa owing to enemy pressure and are retiring along the railway towards Belebei." At points the Bolsheviki were driven back 20 to 33 miles; masses of panic-stricken prisoners were taken, who reported that from 30 to 60 per cent of their effectives vanished when ordered to advance. The condition of Siberia at this time was one of chaos, misery, starvation, intrigue and bloodshed, "with the smoldering red terror of Bolshevism awaiting to overwhelm all." While the greatest shortage prevailed in the cities and plains, the wharves of Vladivostok were piled up with supplies from America — cotton, machinery, guns and railroad material. Most of this had been landed before the Revolution, and Allied vessels were still pouring in supplies, the distribution of which was hindered by frequent breakdowns on the railway owing to the destruction of tunnels. It was perhaps regrettable that the proposed Allied intervention, based on the Japanese and Chinese armies, had not been allowed to proceed across Siberia on a large scale in the summer of 1918, which might have prevented much bloodshed and suffering in European Russia. During April–May 1919 the Allies made good progress. Kolchak's forces gained several important points on a front of 100 miles and had established contact with the Allied Archangel line. At Tomsk, 50 miles south of Ufa, a whole regiment of Bolshevik cavalry went over and immediately turned their weapons against their former comrades. On 4 June 1919 the news leaked out from Omsk that the Siberian armies had passed through a serious crisis within the previous three weeks; they had suffered heavy casualties and "could not hope to overthrow an enemy so vastly stronger . . ." A few days later came the report that a Bolshevik army of 40,000 to 50,000 men had seized the valuable Lena Goldfields in the province of Irkutsk, a region lying within the sphere of the Kolchak government. The numerous roving bands of Bolsheviki in the vast spaces of Siberia had never been subdued, and at places remote from the railway were still able to defy the government. For over six months Kolchak had striven in vain to secure the recognition of his government by the Allied Powers. The congress of the Constitutional Democratic party had urged all Russian citizens to unite around Kolchak in the name of the independence of Russia. The Jewish community in the city of Tomsk placed 1,000,000 rubles at his disposal for the army. His government was the only one in Russia approved and recognized by all political parties outside the Bolshevik ring. The Allies, it appears, were still unconvinced as to the political platform of the Kolchak dictatorship; on the questions of its probable survival and eventual acceptance of the terms laid down in the Peace Treaty. Public opinion in America, Great Britain, France and Italy leaned toward recognition. In their reply to Kolchak's notes on the subject the Council of Four formulated (26 May 1919) eight conditions upon which they were willing to continue their assistance (consult *Current History*, New York, July 1919). Kolchak's undertaking of compliance brought the reply from Paris on 12 June that the Allies were "willing to extend to Admiral Kolchak and his associates the support set forth in their original letter." Colonel Ward, on his return to England in June, recorded that only the Kolchak government was capable of restoring law and order. Toward the end of July Mr. Roland S. Morris, American Ambassador to Japan, arrived at Omsk to investigate conditions with regard to the administration. At the same time a financial group in New York arranged to advance a loan of $5,000,000 to the Kolchak government. On 29 July Mr. Winston Churchill stated in the Commons that Kolchak and General Denikin (the latter in South Russia) were engaging 300,000 Bolsheviki and that the former was continually retreating. On 1 August Kolchak's army was reported in full retreat, demoralized by war weariness. Kolchak's fall was not long delayed. Chaotic conditions followed in Siberia but the Bolsheviki gradually brought this vast region under their control. Consult Coleman, F., 'Japan or Germany: The Inside Story of the Struggle in Siberia' (New York 1918). See Czecho-Slovakia.

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SIBERIAN RAILWAY. See Trans-Siberian Railway.

SIBLEY, sĭb'lĭ, Henry Hastings, American soldier: b. Detroit, Mich., 20 Feb. 1811; d. Saint Paul, Minn., 18 Feb. 1891. He was chosen delegate to Congress from Wisconsin and Minnesota Territories in 1849, representing both in a similar capacity until 1853. He was elected the first governor of Minnesota 1858, and through his personal efforts he successfully brought the Sioux War to a close in 1863. The later years of his life were occupied with the general educational interests of his State.

SIBLEY, Hiram, American financier: b. North Adams, Mass., 6 Feb. 1807; d. Rochester, N. Y., 12 July 1888. In his early life he worked as shoemaker, and later as journeyman machinist in a cotton-factory. In 1843 he established a banking business at Rochester and later was elected sheriff of Monroe County. He was interested in the early experiments in electric telegraph and aided in securing an appropriation from Congress to further the inventions of Samuel F. B. Morse. He combined with other capitalists, among whom was Ezra Cornell, and consolidated the small existing telegraph companies into the Western Union, which was chartered by the legislatures of New York and Wisconsin in 1856. He was elected president of the company and held the office for 10 years. In 1861, he began the construction of a transcontinental railway that was afterward incorporated with the Eastern systems, making a continuous line from the Atlantic to the Pacific. He projected a telegraphic line with Europe by way of Bering Strait and Siberia and to this end obtained valuable franchises from Russia, but the project was abandoned when the success of the submarine telegraph was assured. After retiring from the telegraph business he engaged in railroading, mining operations and various other industries. He owned large tracts of improved land and was interested in a seed and nursery business at Rochester. He founded the Sibley College of Mechanical Arts at Cornell University and presented Sibley Hall to the University of Rochester.

SIBLEY COLLEGE, a department of Cornell University. See Cornell University.

SIBONEY, sē-bō-nā'ē, Cuba, a village 10 miles southeast of Santiago de Cuba near which the United States troops disembarked in the Spanish-American War. It was the scene of a sharp struggle between the American and Spanish forces 23 June 1898. Four troops of Rough Riders, under Colonels Wood and Roosevelt, were ambushed at this point and 16 Americans were killed. Notwithstanding their surprise and losses the Americans charged up the hill with such intrepidity that the Spaniards abandoned their block-house and fortified position, leaving 40 of their dead behind. The village was found to be infested with yellow fever, and in July was burned to the ground at the request of the medical officers.

SIBONGA, sē-bŏng'ä, Philippines, pueblo, province of Cebú, on the east coast, 28 miles west of Cebú, the provincial capital. It is on the coast highway, has a good anchorage, and is open to coastwise trade. Pop. 23,455.

SIBUTU, sē-boo'too, an island of the Tawi Tawi group, Sulu Archipelago, Philippines, 30 miles southwest of the island of Tawi Tawi; 18 miles long, two miles wide; area, 36 square miles. The surface is mostly flat, with a conical hill in the centre rising to the height of 500 feet. It is heavily wooded, and the soil is fertile, but there is no agriculture; there is a transient population of Moro and Sulu fishermen and a small village on the southeast coast. This island was found to be nine miles outside the western line of demarcation under the Paris treaty with Spain, and in 1900 was

bought (with Cagayan) by the United States for $100,000.

SIBUYAN, sē-boo-yän', an island of the Romblón group, Philippines, the second largest and most eastern island of the group, 50 miles north of Panay; area, 90 square miles. It is very mountainous, the highest peak being Mount Sibuyan (6,424 feet); there are three principal rivers, and a number of smaller rivers and streams which furnish excellent drinking water. The island is heavily wooded, and the soil very fertile, but the inhabitants lack thrift and industry, and no attempt is made to develop their natural resources. Some rice, vegetables and an inferior quality of tobacco are raised, for home use only. Gold is found in the sands of the Nailog River, and a number of the inhabitants are engaged in placer mining; trepang and tortoise shells are gathered on the coast. Pop. 18,000.

SIBYL, sib'il, and **SIBYLLINE BOOKS.** Certain women supposed to be inspired by a deity were called Sibyls by the Greeks. Regarding their number and their native countries ancient writers, Greek and Latin, are greatly at variance. Neither Homer or Herodotus makes any mention of a Sibyl; but Heraclitus, the philosopher, who was a little earlier than the father of history, mentions one Sibyl. Aristophanes, Plato and the author of a book, 'Wonderful Stories,' anciently attributed to Aristotle, appear to know of only one Sibyl. Varro, the great Roman polymath, reckons 10 Sibyls, namely the Persic, Delphic, Cumæan (of Cumæ in Italy), Erythræan, Samian, Cuman (of Cymæ in Æolis), Hellespontic, Phrygain, Libyan and Tiburtine (worshipped at Tibur). These Sibyls lived in different epodes, and, according to Pausanias, the earliest was the Libyan; he refers the Erythræan Sibyl to the time of the Trojan war; his third Sibyl is the Cumæan (of Italian Cumæ), the most celebrated of them all. In the traditional history of the Roman kings, she sold to Tarquin the Proud the Sibylline books. First she offered him nine; these refused, she burned three and offered, at the same price, the remaining six; Tarquin again refused to buy, whereupon three others were burned and the last three offered, still at the same price, and were bought by Tarquin. In these books was written the fate of the Roman people and state. They were entrusted to a commission of 15 members, who were to consult them on occasions of public danger, for direction as to the religious observances necessary to avert extraordinary calamities and to expiate prodigies; they were written in Greek hexameter verses, and hence, the commission of the Quindecimviri Sacris Faciundis was always assisted by two Greek interpreters. The books were preserved in a stone chest deposited in the temple of Jupiter Capitolinus and were destroyed by the fire that consumed the temple in the year 83 B.C. To recover the Sibylline prophecies, the Senate seven years after sent ambassadors to Erythræ in the Troad, who brought back thence about 1,000 verses; other verses were collected in Ilium, Samos, Sicily, Italy and Africa. In addition there came into circulation about this time a great many so-called Sibylline oracles Augustus, 12 A.D., ordered strict search to be made for these, and a great many of the spurious oracles were burned; the authentic Sibylline verses after being subjected to critical revision, were deposited in the temple of the Palatine Apollo: they appear to have been still in existence as late as the year 400. The Fathers and other Christian authors often quote the Sibylline verses as containing prophecies of Christianity: a memorable instance of this is the coupling of Sibylla with David in the first stanza of the *Dies Iræ — teste David cum Sibylla,* witness David with the Sibyl, as both of them prophesying the destruction of the earth by fire: these Sibylline verses were undoubtedly spurious, most of them composed by learned Jews of Alexandria in the century next preceding our era; such of them as have come down to our time have been collected and repeatedly printed. Consult Renan, 'Hist. du peuple d'Israël' t. v., l. iv., ch. 9, 'La Sibylle Juive.'

SICARD, sik'ärd, **Montgomery,** American naval officer: b. Utica, N. Y., 30 Sept. 1836; d. Westernville, N. Y., 14 Sept. 1900. He was appointed acting midshipman in 1851 and rose to be lieutenant in 1860. He was assigned to the Gulf blockading squadron in 1861 and as executive officer on the *Oneida* was engaged at the bombardment of Forts Jackson and Saint Philip. He assisted in the destruction of the Confederate flotilla in 1862, participated in the passage of the Vicksburg batteries and commanded in the engagement with the Confederate ram *Arkansas* in that year. He was in command of the *Seneca* in both attacks on Fort Fisher and was in charge of the left wing in the naval land assault on that fort 15 Jan. 1865. He was engaged in various commands after the Civil War, was inspector of ordnance at the Boston navyyard in 1880–82, chief of the bureau of ordnance in 1882–90, and in 1894–97 he was successively in command of the Portsmouth and Brooklyn navyyards. He was appointed commander-in-chief of the North Atlantic Squadron in 1897 with rank as rear-admiral, but at the outbreak of the Spanish War was placed on sick leave. After partial recovery he asked for active duty and was appointed president of the board of strategy. He was retired in 1898 after 47 years of service.

SICARD, sē-kär, **Roch Ambroise Cucurron,** educator of the deaf and dumb: b. Fousseret, near Toulouse, 20 Sept. 1742; d. Paris, 10 May 1822. He was appointed in 1786 director of a school established for the training of deaf-mutes by the archbishop of Bordeaux. In 1789 he removed to Paris, and was chosen successor to the Abbé l'Epée as director of the Paris Institution for Deaf-mutes. He made some important improvements in the system of his predecessor. During the Revolution he narrowly escaped with his life; and having under the Directory become one of the conductors of the 'Annales Religieuses,' it was only by concealing himself that he avoided the consequences of a sentence of exile pronounced against himself and other journalists. On the overthrow of the Directory he resumed his duties at the school of instruction for the deaf and dumb, and in 1816 he was made member of the Academy. Besides other works, he was the author of 'Cours d'Instruction d'un Sourd-muet de Naissance'; and 'Théorie des Signes pour l'Instruction des Sourds-muets.' Consult Berthier, 'L'Abbé Sicard' (1875).

SICCA, a weight in India of about 180 grains troy. The sicca rupee, formerly a current coin in India, contained about 176 grains of pure silver, and was equal to about 50 cents.

SICILIAN VESPERS, the name given in history to the massacre of the French at Palermo, Sicily, on Easter Monday, 30 March 1282, because the first stroke of the vesper bell was the signal agreed upon for the massacre to begin. Charles of Anjou, brother of Louis IX of France, had become master of Naples and Sicily by the defeat and death of King Manfred at the battle of Benevento, and the execution of Conradin, Manfred's nephew, and rightful king, who was only about 16 years of age. Charles treated his Sicilian subjects as a conquered people, and the French garrisons in Palermo and other places committed the gravest outrages upon the inhabitants. Women especially were victims of the brutal soldiery, and the animosity of the Sicilians toward the French became aroused to a high pitch. Meantime Giovanni di Procida, a nobleman who had been deprived of his estates by Charles for his fidelity to Manfred, was actively seeking to bring about the expulsion of the French from Sicily. Constantia, a daughter of Manfred, was married to King Peter, of Aragon, and Procida appealed to Peter, and also procured the necessary means to enable Peter to move against Charles. The Sicilians, encouraged by Procida, and directly inflamed, it is stated, by a gross insult offered to a young Sicilian bride by a French soldier, planned a general uprising and massacre. At the appointed signal the people of Palermo fell upon the French, sparing neither age nor sex, and cutting off also Sicilian women who were companions of Frenchmen. The number massacred was about 8,000. Messina in April followed the example of Palermo, and while Charles was besieging Messina, King Peter landed at Palermo with 10,000 foot-soldiers and 800 men-at-arms. Charles fled to Calabria, and the succession to the crown of Sicily was settled on James, the second son of Peter and Constantia, the ultimate result being the independence of Sicily under Frederick, a brother of James.

SICILIES, sis'i-liz, **The Two,** a former kingdom of Italy, consisting of Naples and Sicily. After the fall of the Western Roman Empire (476 A.D.) Lower Italy became subject to the Ostrogoths. About the middle of the 6th century Naples and Sicily fell under the power of the Greek emperors. Both countries were subject to one governor, the exarch of Ravenna, who conducted the administration by means of dukes. During the contest between the exarchs and Lombards there sprang up, in the 9th century, several independent duchies, such as Salerno, Capua and Tarento. The most powerful was the Lombard duchy of Benevento. Naples, Amalfi and Gaeta maintained themselves as republics. About the same time the Saracens invaded Calabria from Sicily. They conquered Bari and contended with the Greeks for the possession of Lower Italy, until the Emperor Otho I (967) subjected Benevento to the German Empire. Germans, Greeks and Arabs now struggled for the possession of this beautiful country. This induced some warlike adventurers, Normans from France, in the 11th century, to try their fortune here. They assisted the Greek duke Sergius against Prince Pandorf of Capua, and were rewarded with the tract of land on which they founded the town of Aversa. More Normans soon followed. In 1047 the 12 sons of Tancred de Hauteville, a count in Lower Normandy, came in with their followers. Among these brothers Robert Guiscard was the boldest and most artful. He contrived to gain over the peasants and formed out of them his best soldiers. His policy led him to hold Apulia, which he had conquered, as a papal fief (1053); and he promised likewise to hold as papal fiefs such tracts as should afterward be subdued by the Normans in Calabria and Sicily. He then (1060) took the title of Duke of Apulia and Calabria. His youngest brother, Count Roger, conquered Sicily in 1072, and, after the death of Count Robert and his sons, united in his own person the whole power of the house of Hauteville. His son and successor, Roger II, completed, after 1101, the conquest of all Lower Italy by subduing Capua, Amalfi and Naples, at that time celebrated commercial republics. He then received, in 1130, from the Anti-pope Anacletus II, by whom he was solemnly infeoffed, the title of king of Apulia, Calabria and Sicily. Uniting Sicily to his Italian dominions he now called his kingdom the kingdom of the Two Sicilies. This union of Naples and Sicily continued 150 years. Each country preserved its existing laws.

In 1268 Charles of Anjou, brother of Louis IX of France, caused the legitimate heir, Conradin of Swabia, to be beheaded. Sicily freed herself in 1282 from the oppressions of the French by the aid of King Pedro of Aragon, and Naples was now separated from it, Sicily being under the kings of Aragon, while Naples was under the Angevin dynasty. This dynasty was dispossessed in 1442 by Philip V of Aragon, who bestowed Naples on his natural son Ferdinand.

In 1504 Sicily was again united to Naples under the Spanish crown, and governed by viceroys till 1713, when the Peace of Utrecht again divided the Two Sicilies, Naples falling to Archduke Charles of Austria, Sicily to Duke Victor Amadeus of Savoy. King Philip V of Spain reconquered Sicily in 1718, at the instigation of Alberoni, but was forced to cede it to Austria in 1720, Savoy receiving Sardinia in exchange, by which means the Two Sicilies became a part of the Austrian dominions. In 1734 the Spanish Infante Don Carlos, son of Philip V, at the head of an army invaded Naples, conquered both the continental and the insular part of the kingdom and was crowned at Palermo in 1735 as Charles IV. This change was sanctioned by the Treaty of Vienna (1783), and till 1860 this line of the Bourbon family maintained possession of the Two Sicilies, except for a few years during the Napoleonic period, when Joseph Bonaparte and Joachim Murat reigned on the mainland as kings of Naples. In 1759, when Charles IV ascended the Spanish throne under the name of Charles III, he conferred the kingdom of the Two Sicilies on his third son, Ferdinand, and decreed at the same time that it should never again be united to the Spanish monarchy. The reign of Ferdinand extended through the stormy period of the French Revo-

lution and the subsequent European commotions. His successors, Francis I, Ferdinand II (Bomba) and Francis II were despotic tyrants who forced the people into periodic revolt, put down with much severity. In 1860, however, an insurrection broke out in Sicily, and an expedition of volunteers from Piedmont and other Italian provinces under Garibaldi sailed from Genoa to the assistance of the insurgents. The result was that the Neapolitan troops were driven from the island. Garibaldi, following up his success, crossed over to the mainland, where he met little or no opposition; Francis II fled from Naples; the strong places in his hands were reduced; and by a popular vote the kingdom of the Two Sicilies ceased to exist as such and became an integral part of the kingdom of Italy. See ITALY.

SICILY, the largest, most fertile and most populous island in the Mediterranean, belonging to Italy, was formerly a part of the kingdom of the Two Sicilies (q.v.). It is separated from the mainland of Italy by the deep but narrow Strait of Messina, which is from 2½ to 14 miles wide and 24 miles long. In shape the island resembles a triangle, hence the Greeks named it Trinacria, the "three-cornered." Sicily extends from lat. 36° 38′ to 38° 18′ N.; long. 12° 25′ to 15° 35′ E. From the Saracen period until the beginning of the 19th century the island was divided into three districts, but in 1817 it was divided into the following seven provinces, each with a chief city of the same name:—

PROVINCES	Area in square miles	Population, 1915
Caltanisetta	1,271	354,288
Catania	1,907	819,944
Girgenti	1,175	409,133
Messina	1,254	537,348
Palermo	1,927	804,580
Siracusa	1,433	500,664
Trapani	968	367,507
Total	9,935	3,793,464

Physical Features.—A range of mountains commencing in the northeastern extremity of the island stretches across it taking the name first of the Neptunian and then of the Madonian Mountains. The whole range bears a strong resemblance to the branch of the Apennines which stretches to the southern extremity of Italy and strongly countenances the opinion generally entertained that it was originally continuous with it and that Sicily consequently must at one time have been a part of the European continent. The most remarkable natural feature of Sicily and one of the greatest wonders of the world is Mount Etna (q.v.), which attains a height of 10,874 feet. Compared with this all the other summits of the island are insignificant, the loftiest of them, Calatabellota, Monte Cuccio, Monte Scuderi and Dinnamare over Messina being all between 3,000 and 4,000 feet. The great majority of the mountains have a far less average height. Their sides are generally covered with magnificent forests. The rivers and streams are very numerous, and not a few of them of classical celebrity, but they are individually insignificant, and in summer are often almost without water. None of them are navigable. The most deserving of notice are the Giaretta or Simetus on the east coast, the Salso, Platani, Calatabellota or Isbura and Belice on the south and southwest, and the Termini, Fiume Grande and Pollina on the north. There are no lakes worthy of the name; the largest is Lentini, not far from the east coast.

Climate.— The climate is excellent and, except in some spots where the air becomes tainted by the effluvia of morasses and stagnant pools, very healthy. The mean temperature in August, the hottest month, is 78° F., and in January, the coldest month, 52°, a difference of only 26°. On the hottest days the thermometer rises to 90° and 92°. The sky in summer is for the most part beautifully clear and serene, but after the autumnal equinox dews and fogs increase, and rain falls in frequent and heavy showers. The most annoying wind is the southeast or sirocco, which, blowing from the deserts of Africa, is almost intolerable from its stifling heat. Much rain falls in winter, usually commencing in November, and continuing to fall at intervals, often in very heavy torrents, with vivid lightning and occasional snow-storms, till March, while not infrequently, particularly in the interior, long droughts prevail from April to November, to serious injury of the harvest and vintage.

Geology.— Etna itself, and the large circular space of which it forms the centre, extending west to Bronte and east to the coast over the whole tract that lies between Catania and Taormina, is covered completely with volcanic products. Granite, with gneiss and mica-schist, has its only large development in the northeast. The Jura-limestone occupies only two small patches; but the series of rocks immediately above the limestone and belonging to the Cretaceous system are so largely developed as to cover at least a half of the whole surface of the island. The rocks of the Tertiary formation occur chiefly in the southeast and the west. The minerals of Sicily are more numerous than valuable. They include argentiferous lead, quicksilver, iron, copper and antimony in quantities so limited that few of them are worked; lignite, bitumen, petroleum and naphtha; asbestos, gypsum, emery, alum, rock-salt, nitre, sulphur and a great variety of marbles, agates, amber, chalcedonies and jaspers. The most important of all these is sulphur, which has been worked in mines for more than three centuries and about 400,000 tons is exported yearly. There are some 300 of these mines.

Vegetation, etc.— Both the climate and rich soil of the island procure for it both a very large amount and great variety of vegetable products. The hilly regions, presenting alternately bold crags and undulating slopes, are generally clothed with forests of fine timber, among which the prevailing trees are oak, ash, pine, elm and chestnuts; or covered with pastures, on which numerous flocks and herds are reared. In the lower grounds cultivation is general, and the crops are often remarkable for their luxuriance, though the mode of culture is rather unskilful and careless. The most important crops are wheat, maize, barley and lentils or other pulse. Next to grain the most important objects of culture are the vine and the olive, the orange and the lemon. The produce of the vine is partly dried into raisins but is much more frequently converted into wines of various kinds and generally of rich flavor. Sicily sends out two-thirds of Italy's wines. Other vegetable products deserving of notice are the mulberry, extensively used in rearing silkworms; saffron and sumach; cotton, which has its chief locality near Mazzara; manna obtained by incisions in the bark of a species of ash, various species of fruit, more especially the Indian fig or prickly-pear, on which when in season great numbers of the lower orders subsist, the almond, common fig, date, liquorice-plant and sugarcane. To these might be added a great number of trees and plants valuable for fruit, fibre, medicinal properties or the essences extracted from them.

Manufactures, Trade, etc.— The manufactures, which are not very important, include the ordinary silk, woolen, linen and cotton tissues, for the most part of a coarser description; oil-cloths, leather, cordage, glass, earthenware, etc. Trade suffers much from want of inland communication, but the vast extent of sea-coast and the many valuable products indigenous to the island will in time make it much greater than it is at present. The only occupation for which the Sicilians seem to show any particular predilection is that of fishing, for which they possess numerous advantages, the sardine and tunny fisheries along the coast being the finest in the Mediterranean. The most important articles of export are oranges and lemons, wines, essences, sulphur, olive-oil, sumach, silk, liquorice and cream-of-tartar; of imports, colonial produce, cotton and woolen yarn, silk, linen, cotton and woolen goods, hides, hardware, etc. Commerce is mostly in the hands of English and Swiss; before the war a large part was controlled by German firms. About 1,000 miles of railways are in operation.

Religion, Education, etc.— The Roman Catholic is the established religion and the great body of the people nominally belong to it, though a considerable number of Greeks, who profess the worship of their own church, live in different parts of the island, and more especially in the vicinity of Palermo. Education is much neglected. As late as 1864 upward of nine-tenths of the population were wholly uneducated. National schools are now, however, everywhere established, and the towns possess commercial and grammar schools. Lower grade education is compulsory. Palermo, Catania and Messina can even boast of universities, with a student roll (1914) of 1,803, 1,254 and 458 respectively.

History.—According to early tradition the first inhabitants of Sicily were Cyclopes and Lestrygonians, a kind of fabulous beings, who long furnished the poets with ample materials, of which, among others, Virgil has largely availed himself. Certain it is that among its inhabitants, invaders and rulers, Sicanians and Sikelians (Siculi), Phœnicians, Carthaginians, Greeks, Romans and Byzantines, Vandals, Saracens, Normans, French, Germans, Spaniards and Neapolitans have succeeded one another and none of these successions was without its accompaniments of violence and destruction. Invasions, conquests, tyrannies, exactions, revolts, rebellions, repressions, massacres, pestilences and famines have been terribly frequent incidents in the history of the island. To this list must also be added the ravages of earthquakes and volcanic outbursts. Sicanians (Sicani) from Iberia were the earliest known inhabitants of Sicily, who gained such a footing in the island as to change its name from Trinacria, which it had hitherto borne, to that of Sicania. The Aryan Siculi, driven from Italy, crossed the straits and having vanquished the Sicanians, gave the island the name which it still bears. After a considerable interval the Greeks began to plant colonies on the coast, and founded a number of towns, of which Syracuse, Agrigentum and Messina became the most celebrated. They were not, however, allowed to remain in undisturbed possession. The island was conquered first by the Carthaginians and next by the Romans; and on the decline of their empire, it was overrun by the Goths, who retained possession till Belisarius expelled them. In the beginning of the 9th century the Saracens became masters and continued so till their expulsion by the Normans, who remained long enough in possession to establish the feudal system in all its rigor. For a continuation of the history of Sicily see SICILIES, THE TWO, and also ITALY. Consult Baedeker's 'Southern Italy'; Baldacci, L., 'Descrizione geologica dell' isola di Sicilia' (Rome 1886); Bruccoleri, G., 'La Sicilia di Oggi' (Rome 1914); Freeman, E. A., 'History of Sicily' (4 vols., Oxford 1891–84); Hare and Baddeley, 'Sicily' (London 1905); Holm, 'Geschichte Siziliens im Alterthum' (1870–98); Macmillan's 'Guide to Italy and Sicily' (London); Wermert, G., 'Die Insel Sicilien' (Berlin 1905).

SICK, Foods for the. That diet is one of the strongest factors in the control as well as in the progress of certain types of disease is practically an axiom to this generation and one appreciated, especially by the nurse upon whom falls the carrying out of the doctor's orders. Strict observance of a regimen prescribed by the physician in charge of a case, with no pampering of a patient's preferences and no indulgence of a person's own theories, is the stern duty of one who would most fundamentally and materially alter a diseased or abnormal physical condition. Very frequently there is increased demand for food in sickness, too often associated with partial or complete inability to take it or, if it is taken, to digest it properly; gastric secretions are almost always perverted in acute or chronic diseases and appetite and taste, under normal conditions a safe criterion, may have to be disregarded in abnormal circumstances.

Too much care cannot be given to the service of meals during illness. The psychological influence exerted upon a healthy person by the manner of the preparation of food is now proved to be very great as an actual aid to appetite and digestion, though it has been practically ignored for centuries. How greatly exaggerated this influence would be in illness may be readily perceived. Therefore, the invalid's tray must be made attractive at any cost of effort or even of time on the part of the nurse; it is her special province, and perhaps the only one in her professional sphere in which she may give play to her æsthetic sensibilities. It is, therefore, not true that a woman without æsthetic sense makes

the best nurse, for this especial reason of attractive service and for the very potent reason that an invalid with any æsthetic perception (made keener by illness) will need a nurse's sympathy and appreciation of his condition and point of view.

All service should be upon the very best china and linen available, with variation in these if possible; the least novelty or diversion is acceptable, as the strongest people are often reduced by illness to childlike attitudes. A freshly cut flower on a tray adds greatly to its first effect upon a patient and attractive garnishes to even unattractive dishes may be devised by a skilful nurse. The color of paps and gruels is not appetizing; the color of beef juice is absolutely revolting to very many; therefore, opaque ware is to be selected for serving such. If a bent tube be used for the patient to take liquids with, much discomfort of sitting up or disgust at seeing what is being taken may be avoided. In quantity the service must be underestimated rather than overestimated; sufficient porridge for a day laborer will have little charm for a patient with no appetite. Care must be taken in conveying the tray that nothing upon it be spilled or smeared. Too much stress cannot be put upon these points.

A nurse must know the underlying principles of food values and their chemical composition, as well as the proper preparation of foods of each class to make its essential properties best available to the disturbed digestion. She must know that steak or chop slightly broiled is more easily digested than the "well-done" variety; that an egg slightly boiled, or one well mixed with air by beating, gives up its albumen with least resistance to the digestive juices. On the other hand, starchy foods must be long subjected to boiling temperature that the starch-cells may be ruptured, and digestion of them, so difficult even in health, be begun for the invalid. Seasoning and especially the handling of the smell of food, is a more important point in sick-cooking than under ordinary conditions, and may be used extensively on account of the mild stimulating action of condiments on the gastric juices, as well as for their flavor, although a judicious nurse will not apply this principle to excess. Tea, chocolate, cocoa and coffee may be used with moderation except in certain troubles in which they will be specially forbidden; they combine slight restorative power with some nutritive value and at least do no harm.

The time of administering food is another important point. In but few instances is sleep to be interrupted for the sake of a meal. The best times are when the patient has been quiet for a while and can be quiet for at least an hour more; that is, undisturbed by visits from doctor or friends, by baths or bedmaking, or anything tending to excitement. If a fever is present the most abundant meal of the day should be given when the fever is at its lowest, as gastric juices are least active in presence of fever.

Food may be selected in some measure with regard to the affected part. Throat and lung troubles demand non-irritating foods, or even those of a soothing character, as flaxseed tea; a disease involving the stomach would demand food the digestion of which is accomplished in the intestines, as carbohydrates or starches; and vice-versa. The quantity and total amount are determined by the patient: a suppurative process demands much and frequent feeding, as it uses tissue at an almost unthinkable rate; the cure of consumption is largely a stuffing process; in some acute illnesses food may be withheld for over 24 hours with great benefit, but the diet must be very carefully guarded when food is resumed. Some of the more important foods for the sick are here given, with modes of preparation and some indications of their spheres of usefulness.

Liquid Foods Made of Water.— Used as cooling drinks in fevers.

Lemonade.— This is best prepared by making a syrup of one cup of water and one-half cup of sugar, boiled 5 or 10 minutes. Make the drink as it is needed in the proportions of two tablespoonfuls of syrup to one of lemon-juice and one-half cup of water. Mineral waters may be substituted for plain water, especially when the stomach is irritable.

Orangeade.— Use one and one-half tablespoonfuls of the same syrup as for lemonade and the juice of an orange — less if the orange is sweet. Pour over crushed ice.

Grape-juice.— Thoroughly clean one and one-half cups of Concord grapes, add one cup of cold water and cook one and one-half hours in a double boiler. Add one-half cup of sugar, strain and cool.

White grape-juice and ginger ale, half and half, makes a pleasing mixture for many convalescent patients. Cut orange, maraschino cherries and a sprig of mint give it an attractive bouquet.

Irish Moss Lemonade.— Soak one-quarter cup of Irish moss in cold water to cover it; remove this, add two cups of fresh water and cook 20 minutes in a double boiler. Strain and to one-half cup of liquid add sugar and the juice of one lemon.

Flaxseed Lemonade.— Into one pint of boiling water put two tablespoonfuls of sugar and three of whole flaxseed. Steep one hour; strain and add the juice of a lemon; serve direct from the ice. This is desirable in throat and lung troubles, giving relief as well as affording some nutriment. It is very soothing in tonsilitis.

Potus Imperialis.— To one quart of boiling water add one-half ounce of cream of tartar, the juice of a lemon and two tablespoonfuls of sifted sugar or strained honey. Cover this until cold. This is a useful drink in fevers if the urine is high-colored or scanty.

Egg-water.— The white of one or two eggs well beaten is to be put into one-half pint of ice-water with a little salt or sugar. This may be given to the weakest patient and will almost invariably be retained, while the albumen will afford necessary nourishment. The water may be flavored with sherry or may be changed to lemonade, orangeade or grape-juice. Almost any fruit-water is refreshing to a patient, especially if he is suffering with fever or chronic disease or convalescing. The acids and salts of fruit are valuable food additions, though they may not be relied on to furnish nourishment to any appreciable extent. Rhubarb drink well prepared is very refreshing and almost always beneficial; green gooseberries and mulberries afford a variety in their season and all the juicy berries of summer make good drinks. The liquid for all these should be perfectly clear after straining and never contain any pulp or seeds.

Gum-arabic Drink.— Make with one ounce of gum-arabic to one pint of boiling water, seasoned with two tablespoonfuls of sugar, sherry and the juice of a large lemon.

Bran-tea.— To one pint of wheat bran add one quart of boiling water; keep this hot, but boil less than one hour. Strain and serve with sugar and cream. Corn-tea is made in the same proportions of parched corn ground in a mortar.

Toast-water.— Cut stale bread in one-quarter-inch slices and dry thoroughly in the oven until crisp and brown. Break into small pieces and add an equal quantity of boiling water; all this to stand an hour; then season with salt, strain and either chill or reheat. A little wine may be added. This is often beneficial in cases of extreme nausea.

Rice-water.— Wash two tablespoonfuls of rice and add two cups of boiling water. Stick-cinnamon or lemon-peel may also be added. Boil one-half hour, strain and reheat or chill as desired.

Barley-water.— Soak three tablespoonfuls of barley overnight; boil in four cups of cold water for one and one-half hours; strain and season with salt, lemon-juice and sugar. The starch of barley is very beneficial for diminishing a laxative condition.

Oatmeal-water.— Take one-half cup of fine oatmeal with one quart of boiled water; set in a warm place for one and one-half hours; strain and cool. It makes an excellent summer drink, is always safe in quantity in the hottest weather and is valuable in diarrhœa of children.

Macaroni-water.— Indian meal or any of the starchy foods may be used for this water in similar ways. Above all, such waters must be made palatable and should be served in a manner that does not betray their weak character. By increasing the amount of cereal and by longer boiling, a gruel may be made.

Oatmeal Gruel.— Boil one tablespoonful of oatmeal in one pint of water three-quarters of an hour; strain it and if too thick reduce to desired consistency with boiling water. Season with salt.

Oatmeal Gruel with Milk.— This is made by soaking the oatmeal in water overnight in proportions of half as much cereal as water. Boil an hour in the same water, then blend thoroughly with one pint of boiling milk and boil five minutes more.

Caudle.— Beat one egg to a froth, add a wineglass of sherry and one-half pint of any kind of gruel; flavor with nutmeg, lemon-peel and sugar.

Gruels are comprised under the head of semi-solids. Discretion must be used in the administration of gruel when symptoms of inflammation are present, since starch in general, and corn or oatmeal gruel in particular, are very heat-productive. Care must always be taken in making gruels to cook them thoroughly, that the starch may be made altogether available to a weak digestion. Arrowroot is advisable as an especially digestible gruel and of avail even in the presence of irritation of the stomach.

Mulled Wine.— Soak broken stick-cinnamon and one-half dozen cloves in one-half cup of boiling water for 10 minutes. Strain and add the beaten whites of two eggs and two tablespoonfuls of sugar. Into this pour from a height one cup of sweet wine that has been boiled (but not in tinware). Pour from glass to glass several times to make it light.

Pap.— Thicken one pint of milk with one tablespoonful of flour; cook 10 minutes and beat in the white of an egg if desired. Corn-starch, rice-flour and arrowroot are used also in this way as thickening.

Plum Porridge.— Mince 12 raisins and bring them to a boil in one pint of milk; thicken with one teaspoonful of corn-starch in a cold-water paste and boil five minutes; strain and serve. Raisins impart a fruity taste that gives variety, and they afford the easily-digested fruit-sugar. This is of service in diarrhœa.

Sago-milk.— Take one tablespoonful of pearl sago, wash and soak it overnight in four tablespoonfuls of cold water. Boil the sago with one quart of milk in a double boiler until the sago is dissolved. Sweeten slightly and serve hot or cold.

Treacle Possett.— Boil a cup of milk and stir in one tablespoonful of molasses. Bring this to a boil and strain before serving.

Milk preparations may be provided in great variety and often with the most desirable results. The more useful of them are specified below.

Albuminized Milk.— The white of one egg, one-half cup of milk and a pinch of salt are shaken together thoroughly and chilled.

Milk Punch.— To one-half pint of milk add one tablespoonful (or less, according to case and individual) of whiskey, rum, brandy or sherry, sugar and a few gratings of nutmeg. Mix, cover and shake well. The milk may be hot if so desired.

Kumiss.— Dissolve one-third of a yeast-cake in one tablespoonful of lukewarm water; add this to one quart of warm milk to which one and one-half teaspoonfuls of sugar has been added; fill strong bottles to the neck and cork them firmly; then invert them and allow them to remain for fermentation at about 80° F. Chill after six or eight hours. Remove the corks with care or draw off the kumiss with a champagne tap.

Sterilized Milk.— Fill perfectly clean pint bottles with milk almost to the top and plug with absorbent cotton; place all the bottles in a steamer so arranged that they will not touch the bottom or each other. Immerse in cold water to three-fourths their height and bring this bath to the boiling point; keep it at 170° F. for about 10 minutes. Remove cotton plugs and cork bottles with rubber corks if possible, keeping them in a cool place until used; then use the milk only once, never offering a second time even to an infant.

Pasteurized Milk.— This is similarly prepared, but the water is on no account allowed to boil and is kept at 167° F. for 30 to 60 minutes Special pasteurizers are available for this purpose.

Peptonized Milk.— Mix thoroughly five grains of pancreatic extract and 15 grains of bicarbonate of soda in two tablespoonfuls of water; add one pint of fresh milk and keep warm (about 115° F.) in a covered jar for one-

half hour; then chill the mixture. If the resulting slightly bitter taste is disagreeable, the preparation may be sweetened. Peptonizing tubes may be bought all prepared for use in this process.

Water and fresh milk, boiled in equal parts, will afford relief in cases of mild exhaustion, being quickly absorbed with the least possible effort. In giving milk to a patient the most important point to observe is very slow administration; it must be eaten rather than drunk, even under normal conditions, and a weak stomach cannot manage its curd in bulk. Lime-water or bicarbonate of soda, added in small quantity to milk in cases of acidity of the stomach, may prevent the formation of curd. In bad cases of nausea milk may be retained if fed by the teaspoon at short intervals. In all cases of milk diet in whole or in part it is safer to pasteurize or sterilize the milk unless one is perfectly sure of its source and its mode of transportation. This would practically obviate any risk. The change from a solid to a milk diet must be made gradually; also, if the case no longer warrants all liquid, the change back to solid must be gradual, as the digestive system will rebel at sudden alterations in regimen. The amount of milk to be given daily, its modifications and the frequency of administration will be regulated by the physician in charge of the case.

Beef preparations are likewise made in many ways, so as to adapt them to different patients in various circumstances. Those described below will all be found to possess special advantages.

Beef-tea.—A pound of beef cut from the round or neck is cut into very small pieces, put into an earthen or porcelain pot, covered closely and allowed to soak in one quart of cold water for an hour or two. Heat in the same vessel to the boiling point, then allow the preparation to simmer two hours, or until the salts and soluble albumen of the beef are quite extracted. Season this and strain it or not, as desired; remove all fat, however, when the tea is served, as the least trace of fat is disgusting to a sick person. A perfectly clear liquid may be obtained by stirring in the beaten white of an egg and again straining. This beef-tea is stimulating, but by no means nutritive, as most of the albumens have been precipitated by the heat; so discretion must be used in its administration, since it may excite a weak patient and prevent sleep.

Beef Essence.— Finely mince one pound of lean beef (no fat); put into a fruit-jar, cork tightly and set into a kettle of cold water over a slow fire; let it boil three hours, then strain through a sieve and season with salt and red pepper. Another method of preparing this beef essence, which has some nutritive value in addition to the stimulating quality, is to add one pint of cold water to the minced beef in the jar, allow it to macerate for three hours, with occasional stirring, and to simmer in the water bath after it has once come to the boiling-point. Strain as before and wash the remainder with cold water to make the whole measure one pint. Vary the flavor if it is often given by bay-leaf, clove, mace, celery or other aromatic substance.

Peptonized Beef-tea.— To one-half pound of raw lean beef that has been finely minced add 10 grains of pepsin and three drops of dilute hydrochloric acid. Put in a tumbler, cover with cold water and stand for two hours in a warm place (about 90° F.), stirring frequently. This should always be used the day it is made, although most of the other beef preparations may be kept sterile on ice for some time.

Bouillon and Consommé.— These may be given to a convalescent as usually prepared; they are too stimulating, however, for a weak patient.

Beef-juice.— Broil one-half pound of lean juicy beef over a hot fire, turning frequently, merely to the point of heating the meat through; cut the meat into dice, and extract the beef juice with a meat-press or a lemon-squeezer. Heat the extract by setting in a dish of hot water; never apply enough heat to coagulate the juices, as they would be rendered less digestible, defeating the express purpose of this preparation. This is highly nutritive. Broiled beef-tea is the same preparation diluted, as the case or individual may require, by hot (not boiling) water.

Frozen Beef-tea.— It is often desirable to administer nourishment as pleasantly as possible in hot weather, or in a case of high fever. Any of the beef-teas given above may be frozen. In small quantities it is most convenient to fill a pound baking-powder tin, or other tin case, two-thirds full, and pack with ice and salt in a small pail; stir and beat as the mixture freezes until a consistency of mush is obtained.

Beef-juice and Cereal.— Use one tablespoonful of thoroughly cooked oatmeal or other cereal to two tablespoonfuls of boiling water; add one cup of strong beef-tea; bring all to the boiling point; season well, and serve with toast or crackers.

Bartholow's Food.— Soak one ounce of sago in one-half pint of milk for 10 minutes. To this add one-half pint of beef-tea, the yolk of an egg, beaten, and seasoning of celery salt. This is considered a complete food.

Scraped Beef Balls.—A small piece of round steak is cut into strips, and the freshly-cut surface is scraped with a rather dull knife, reserving all the soft part of the meat and leaving connective tissue. Form the pulp into balls, using but slight pressure; season with a very little pepper and salt. The balls may be either broiled or cooked in an omelet pan that is sprinkled with salt. Serve on toast, and garnish as prettily as possible to divert attention from the raw appearance of beef. The flavor may be altered, if the patient's digestion allows, by additions of minced celery, chopped almonds or other nuts, butter or egg albumen.

Raw Beef Sandwiches.— Use the raw scraped beef, well seasoned with salt; cover half a slice of bread that is cut very thin and buttered; press down the other half, and serve. The object is to serve this raw beef (as attractively as possible) because of its nutritive qualities; the rareness, being often distasteful, must be disguised.

Mutton Broth.— Wipe and clean from skin and fat three pounds of mutton from the neck; cut in small pieces, and put all into a kettle; cover with cold water and bring slowly to boiling-point; then simmer for more than two hours, or until meat is perfectly tender. Strain, skim and add rice or barley.

Veal Broth.— This may be made with one-half pound of veal, chopped fine, to one pint of cold water. Prepare in same way as mutton broth.

Chicken Broth.— Select an older fowl for this, as it makes a more nutritious broth. Remove skin and fat; disjoint and break the bones. Cover with cold water in stew-pan, bring to boiling-point slowly, and simmer for several hours. Season with salt and a little pepper when half done. Strain and remove fat. Rice may be boiled with it at first, and strained out, or it may be added and boiled in the stock.

Chicken Panada.— Chop and rub fine one-quarter pound of the white meat of chicken, raw. Mix with one-half cup of fresh bread crumbs and one-half cup of milk; beat in the whites of two or three eggs. Season and poach in little earthen cups.

Oyster foods have also their peculiar values, and a few of the numerous forms of preparation are here given.

Oyster Juice.— Mince with a silver knife one dozen fat oysters, put them into a fruit-jar and stand in hot water for half an hour. Strain the liquid out, skim and season. This may be diluted or served in concentrated form.

Oyster Broth.—Add one-half pint of cold water before putting the jar, as above directed, in the hot bath. Or the broth may be creamed by the addition of flour and milk.

Oyster Soup.— Rub together two tablespoonfuls each of flour and butter, and add one pint of hot milk; then drain and add gradually the liquor from one pint of oysters; and when the mixture is brought to a boil add the oysters, which must have been well washed. Cook all together until the oysters begin to grow plump and the edges begin to curl. After seasoning, this must be served instantly with crackers.

Oysters possess a slight nutritive value, and all the nourishment is easily available to a weak digestion, especially if the tough adductor muscle be removed. An irritable stomach will often welcome oysters or clams attractively prepared, and benefit by the nourishment. Clams are much tougher than oysters, and should be given to an invalid only as broth or liquor. Whole raw oysters are frequently served to convalescents.

Clam Broth.— Take as many large clams as desired, and thoroughly wash and scrub them; put in a kettle with a very small amount of water in proportion, and cook until the shells begin to open. Then strain the liquor off through cheese-cloth, season and dilute if desired. This may be hot, cold or frozen; it may be kept in this fundamental form for a long time if cooked, and may be varied by flavorings of herbs, or reinforced by pulverized cracker crumbs. By the addition of milk and flour, cream of clams is obtained. The plain broth is very valuable in nausea.

Egg-nog.— This food is made in a number of ways; it is very frequently a staple for invalids of long standing, and a fagging interest in it may be revived by a slight variation. The white and yolk of the egg may be beaten separately or together; the flavoring may be wine, whisky, brandy or, if alcohols are not desirable, vanilla or some fruit-juices; usually a little nutmeg is added, and always salt where eggs are used. The milk may be hot or cold, or one-half milk and hot water may be used. A good standard recipe is as follows: one egg, two-thirds cup of milk, one tablespoonful of sugar, two tablespoonfuls of flavoring if it is a wine, one tablespoonful if brandy or whisky, one teaspoonful if vanilla. If the white of the egg is beaten the patient will find it more convenient to drink with a glass tube or straw.

Bonnyclabber.— Skimmed milk which has become thick by standing. It is served in the same dish it has stood in, with whipped cream or white of egg.

Wine Whey.— Scald one cup of milk, add one cup of sherry or port wine and stand five minutes. Strain and sweeten if desired. Whey can also be separated by lemon-juice, vinegar or rennet.

Junket Custard.— Heat lukewarm (not hot) one cup of milk; add two tablespoonfuls of sugar and one teaspoonful of brandy, or one-fourth teaspoonful of vanilla. To this add one-fourth junket tablet dissolved in one teaspoonful of cold water; turn into small molds and cool. This may also be frozen, if packed in a small tin box and surrounded with ice and salt.

Egg Custard.— Mix one-half cup of milk, one tablespoonful of sugar and one egg, beaten whole. Put into cups and bake in water.

Caramel Custard.— To the above add enough browned sugar to give color and caramel taste.

Chocolate Custard.—Add melted chocolate to regular egg-custard recipe.

Bread Jelly.— Toast brown the inside of five slices of stale bread and soak in two quarts of boiling water with a few slices of lemon; later let this boil to a jelly; strain, sweeten and eat it cold. A little gelatin may be added, but is not necessary.

Chicken Jelly.— This is prepared like chicken broth, but the stock is allowed to solidify. If poured into attractive molds the jelly will be pleasing to the patient; or it may be cut into cubes and used as a garnish to other things. Fresh chicken meat may be molded with the jelly if the patient can eat it.

Wine Jelly.— Take one-half box of gelatin (or two tablespoonfuls of granulated), soak 20 minutes in one-half cup of cold water; dissolve this in one and two-thirds cups boiling water and add one cup of sugar, one cup of sherry or Madeira, one-third cup of orange-juice and three tablespoonfuls of lemon-juice. Strain, mold and chill.

Lemon Jelly.— Make this with one-half box of gelatin dissolved in one-half cup of water, dissolved in two and one-half cups of boiling water; strain and add one cup of sugar and one-half cup of lemon-juice.

Orange Jelly.— Same as wine jelly, using one and one-half cups of orange-juice and three tablespoonfuls of lemon-juice.

Cider Jelly.— Use cider, dilute or not, in proportion of three and one-half cups of liquid to one-half box of gelatin or two tablespoonfuls.

Gelatins in combination with other things are beneficial to ill persons, though by no means highly nutritious; a very distinct flavor is necessary to secure palatability, or even digestibility.

Indian-meal Mush.— Mix one-half cup of Indian meal with one-half teaspoonful of salt and three-fourths cup of milk; stir this into one cup of boiling water and cook three hours in double boiler. Serve with sugar and cream.

Rye-meal Mush.— Mix one-half cup of rye meal with one-half teaspoonful of salt and one-half cup of cold water; add to one and one-fourth cups of boiling water; boil five minutes; then cook in double boiler. Serve with maple syrup if possible or with sugar and cream.

Egyptian Porridge.— Use three tablespoonfuls of lentil flour, mix with salt and one pint of water to a paste. Boil 10 minutes, constantly stirring. This is nutritive and agreeable.

Mushes.— Of all the other ordinary cereals mushes may be similarly prepared, the special precaution being to cook the cereal a sufficient length of time, always one hour, and longer if the heat is not great. For a weak digestion especially the starch in these preparations must be made soluble and directly available, and the only way of accomplishing this is by thorough cooking. Most of the ordinary cream soups are possible to the invalid; precaution must be taken, however, to see that they are especially prepared in order that the butter and flour used for thickening this class of soups be not cooked together; for when this fat and starch are mixed it is well-nigh impossible for an impaired digestion to deal with them. When possible, it is well also to have the milk merely heated and not boiled, as boiling detracts from the beneficial results of milk and tends to constipation. The simpler soups in this class, for which recipes can be found in any modern cookbook, are advisable: such as rice soup, potato soup, black or white bean soup, pea soup, creams of celery, corn or asparagus, tapioca soup, bread soup. If well prepared, these soups would be included under semi-solids, as they must be eaten, not drunk, and contain a good deal of nourishment.

Toast.— This must be made of stale bread from which crust has been removed, and slowly browned over a flame until thoroughly crisp.

Dextrinized Bread.— Stale bread heated in the oven until it has become dark brown.

Torrefied Bread.— Prepared in the same manner as dextrinized, but with greater heat and for a longer time.

Pulled Bread.— Remove all crust from a loaf of loose-textured bread; from the inside portion form strips with forks or fingers, breaking or pressing as little as possible. Put upon a papered pan and bake until of a golden brown color and crisp. Serve with whipped cream.

Care must be taken with bread for invalids that it be thoroughly baked in loaves small enough to warrant complete killing of all yeast. Freshly baked bread is never to be given to a person with even slightly impaired digestion. A loaf should not be cut for 24 hours after baking. Very frequently in disease the stomach and small intestine cannot hold or digest food. In such cases the introduction of food into the bowel through the rectum, by means of a Davidson syringe, is necessary or advisable. Some of the formulæ enemata more commonly used are here given:

Nutritive Enemata.— When it is impossible for the patient to take food as ordinarily, a nutritive enema will be ordered. Special formulæ will probably be given by the physician, but a safe rule is to add to one pint of the foundation liquid (which is usually milk, because of its simple, convenient and unirritating character, though only about one-third absorbed; but may be beef-tea, mild gruel or eggs) one tablespoonful of liquor pancreaticus and 30 grains of bicarbonate of soda. Administer at once after preparation is added.

Special formulæ are given, as they are frequently ordered by name:

Peptone and milk enema: 60 grams peptone, 250 c.c. milk.

Egg and milk: three eggs, three grams salt, 250 c.c. milk.

Sugar and milk: 60 grams grape-sugar, 250 c.c. milk.

Boas' enema: 250 c.c. milk, yolks of two eggs, pinch of salt, 15 c.c. red wine, 15 grams starch or arrowroot.

Riegel's enema: 250 c.c milk, all of two or three eggs, two or three pinches of salt, 30 c.c. red wine.

Tournier's enema: 140 to 150 c.c. beef-tea or raw beef juice, yolks of six eggs, two saltspoonfuls salf, 20 to 40 c.c red wine.

Wine may be omitted from any of these formulæ.

Leube's Pancreas Enema: Mix 50 grams of pancreas, 150 grams lean meat and 30 grams of fat, all chopped as finely as possible in 150 c.c. lukewarm water. This is an attempt to imitate natural intestinal digestion, is claimed to be unirritating as well as nourishing and is retained well.

Enemata should always be given at body temperature, in bulk not to exceed four to five ounces. They must be introduced as high as possible, and be given very slowly; the patient must lie perfectly quiet for at least an hour after injection. During 24 hours three or four nutritive enemata and one cleansing enema are sufficient for a patient. Trial is often necessary with various formulæ before one is found that can be retained. A very small quantity of opium added may help to retain them, but is not advisable without a physician's special orders.

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SICK MAN OF EUROPE, The, a term applied to Turkey in 1854, by the Tsar Nicholas, in a conversation with Sir Hamilton Seymour, the British ambassador at Saint Petersburg. The tsar intimated his opinon that Turkey was sick and dying. He therefore proposed that, to avoid a European war when the demise took place, Russia and Great Britain should come at once to a private arrangement as to the disposal of the Sick Man's effects. As France was ignored in the arrangement, there was some doubt as to the good faith of the tsar. The British government rejected the proposal, intimated its belief in the recovery of the Sick Man, and soon after fought by his side in the Crimean War.

SICKINGEN, zĭk'ĭng-ĕn, **Franz von,** German soldier and Protestant reformer: b. near Kreuznach, 2 March 1481; d. 7 May 1523. From early youth he devoted himself to the military life. The protection of the oppressed was his chief occupation. He assisted many a creditor in procuring what was due him from a powerful debtor. He was the enemy of tyranny, and endeavored on every occasion to repress the despotism of princes and the arrogance of the priests. Without being a scholar he loved science and protected men of learning

(for instance Reuchlin, whom he defended against the monks of Cologne); and in his castle at Ebernburg many persecuted scholars found a safe asylum. He was a friend of the Reformation, and contributed greatly to extend it in the countries which bordered on the Rhine. At last he engaged in a quarrel with Treves, the palatinate, and Hesse, which drew upon him the ban of the empire. He died soon after the surrender of Neustall, one of his castles, having previously received a severe injury from a fall during a sally. Consult the study by Ulmann (1872).

SICKLES, sĭk'lz, **Daniel Edgar,** American soldier: b. New York, 20 Oct. 1823; d. there, 3 May 1914. He was educated at the University of the City of New York, but did not graduate. He began to learn the printer's trade, then turned to the study of law, and was admitted to the bar in 1846. In 1847 he entered the legislature as a Democrat, and in 1853 was appointed corporation counsel for New York. In that year he accompanied James Buchanan to England as secretary of legation. Returning to America in 1855 he was elected to the New York State senate, and two years later became a member of Congress serving until 1861. He was tried for the murder of Philip Barton Key, whom he shot on the street in Washington, D. C., 27 Feb. 1859, on account of a guilty intimacy with Sickles' wife, and was acquitted, the defense being temporary aberration of mind — the first case in which that plea was set up. Key was United States Attorney for the District of Columbia and a son of the author of the 'Star-Spangled Banner.' At the beginning of the Civil War Sickles raised in New York the Excelsior Brigade of the United States volunteers, and was commissioned colonel of one of its regiments the 70th New York. In September 1861 he was nominated brigadier-general of volunteers. He participated in the Peninsula campaign (q.v.) and the battle of Antietam, under McClellan, and at Fredericksburg commanded a division. Having been made major-general of volunteers in November 1862 he was given command of the Third corps in February 1863, and bore a distinguished part in the battles of Chancellorsville and Gettysburg (qq.v.) At Chancellorsville he cut off the enemy's ammunition train, and by rallying the retreating artillery gained the first success of the day. At Gettysburg his corps withstood the Confederate assault on the Federal left, at the Peach Orchard, and Sickles lost a leg in the encounter. He continued in active service until 1865, when he was sent on a private mission to Colombia and other South American countries. He joined the regular army in 1866, and on 2 March 1867 was brevetted brigadier-general for bravery at Fredericksburg and major-general for gallant and meritorious service at Gettysburg. For the latter battle, also, he was awarded the Congressional Medal of Honor 30 years later, 30 Oct. 1897. During the early years of the reconstruction of the South he was in command of the military district of the Carolinas, but in 1867 President Johnson relieved him of his command and offered him the mission to the Netherlands, which he declined. On 14 April 1869 he was placed on the retired list of the army with the rank of major-general. From 1869 to 1873 he was United States Minister to Spain, where he had diplomatic management of the *Virginus* case; in 1890 was sheriff of New York County, N. Y.; and in 1892 was again elected to Congress, where he served till 1897. For one year he was president of the New York State Board of Civil Service Commissioners (1888–89). When the New York Monuments Commission was founded in 1886, Sickles became its chairman, an office he held for 26 years until, in December 1912, he was deposed on account of a shortage of $27,000. In 1902 he was elected commander of the Medal of Honor Legion. So long ago as 1879 the French Republic had decorated him with the Legion of Honor. After the death of his wife Sickles married again in Spain, 1871.

SICOTTE, sē-kōt', **Louis Victor,** Canadian statesman: b. Saint Famille, Quebec, 7 Nov. 1812; d. 1889. He was called to the bar in 1838, later establishing himself in practice at Saint Hyacinthe and becoming a leader of the bar. He was a member of the Canadian Parliament in 1852–63; was judge of the Superior Court in 1863–87; and in 1862–63 was Attorney-General for Lower Canada in the Macdonald-Sicotte administration. He was a leader of the moderate Reformers.

SICYON, sĭsh'ĭ-ŏn, Greece, one of the oldest, most celebrated and handsome of the ancient cities of the country on the Asopus River, about two miles from its port on the Gulf of Corinth. The city is said to have been founded before 2000 B.C. The site is now occupied by the village of Vasilikon. With adjacent territory the city formed the small state of Sicyonia; at an early period it was ruled by princes, but later became a republic (252 B.C.), and joined the Achæan league formed by Aratus, finally coming under the domination of Rome. Sicyon was especially celebrated for its schools of sculpture and painting. It gave its name to a school of art which numbered among its disciples Polycletes and Apelles, both natives of Sicyon. The ancient theatre has been excavated by the American Archæological School at Athens.

SIDDHARTHA ("he who has accomplished his aim"), the name given to Prince Gautama Buddha (see BUDDHISM) at his birth in the 7th century B.C. This was his individual name; Gautama, that of his tribe — settlers in Gakja or Gauta, a region situated between the plain of the Ganges and the Himalaya Mountains. Buddha was a title of later origin. Consult Arnold, E., 'The Light of Asia' (1879).

SIDDONS, sĭd'ŏnz, **Sarah Kemble,** English actress: b. Brecon, South Wales, 5 July 1755; d. London, 8 June 1831. (See KEMBLE ROGER). She appeared early on the provincial stage won some local fame at Wolverhampton and Cheltenham, and was secured by Garrick for Drury Lane, where her failure was distinct. After this she acted successively at Birmingham, Manchester, York and Bath, where she opened in her great part of Lady Macbeth, increasing her reputation to such a degree that she was again engaged at Drury Lane. Her reappearance in London took place on 10 Oct. 1782, in the character of Isabella in the play of that name, being Garrick's adaptation of Southerne's 'Fatal Marriage.' Her success was complete. The public were astonished by her powers, and she

was universally acknowledged to be the first tragic actress of the English stage. She subsequently visited Dublin and Edinburgh with equal applause. She appeared as Lady Macbeth for the first time in London on 2 Feb. 1785, and in that character was declared perfect by competent critics. Christopher North, Hazlitt, Leigh Hunt, Lord Erskine and many others agree in praise of her performances, which were at their best in tragedy, and belonged to the fine old declamatory (sometimes called the «Kemble») school. In solemn majesty, pathos and minute finish she surpassed Rachel (q.v.). For 30 years she continued to astonish and enchant the lovers of the drama, and having acquired an ample fortune, and been portrayed by Reynolds as the 'Tragic Muse,' took her leave of the stage in 1812, before an audience which melted into tears on the occasion. She, however, performed subsequently at benefits and gave privately Shakespearian readings. She was seen as Rosalind, Ophelia and Desdemona, with great success; and as Catharine in 'Henry VIII,' discovered a part nearly as well suited to her as that of Lady Macbeth. Consult the 'Lives' by Campbell (1834); Kennard (1886); Fitzgerald, P., 'Account of the Kemble Family' (2 vols., London 1871); Matthews and Hutton, 'Actors and Actresses of Great Britain and the United States' (New York 1886).

SIDE-SADDLE FLOWER. See SARRACENIA.

SIDEREAL CLOCK, a clock regulated to measure sidereal time, reckoned by sidereal days of 23 hours, 56 minutes, 4 seconds mean solar time, which are measured by the interval between two successive passages of any fixed star over the same meridan, and divided into 24 sidereal hours.

SIDEREAL SYSTEM. See STARS.

SIDEREAL TIME, time measured by the apparent motion of the stars. A sidereal day is the time from the passage of a star across the meridian till its next passage. If the stars are supposed to be absolutely fixed and at an infinite distance, a sidereal day is exactly the period of the revolution of the earth on its axis; the effects of the motions of the stars and the motion of the earth in its orbit are insensible. A sidereal day is the most constant unit of time which we possess; but it appears that it is increasing in duration very slowly. The length of a sidereal day is 23 hours 56 minutes 4.092 seconds. A sidereal year is the exact period of the revolution of the earth round the sun.

SIDERITE, a mineral composed of carbonate of iron, and when pure crystallizing in the rhombohedral system. It then is also known as spathic iron. Another name is chalybite. The faces of the rhombohedral crystals are commonly curved, and there is a perfect rhombohedral cleavage. Besides this it occurs in botryoidal and in globular form, with a more or less fibrous internal structure. Again it is massive, or coarsely or finely granular.

The hardness is 3.5 to 4; the specific gravity 3.7 to 3.9. It has a vitreous lustre, and is often more or less pearly. The color varies from ash-gray, through yellowish-gray, greenish-gray, to brown and brownish-red; sometimes it is white The streak is white. It is commonly translucent or subtranslucent

In composition it is: $FeCO_3$. Part of the iron is usually replaced by manganese, and often by magnesium or calcium.

The principal varieties are (*a*) crystallized, (*b*) concretionary, in globular form, with fibrous structure, (*c*) granular, (*d*) massive, (*e*) oölitic, and (*f*) carthy, with a large admixture of clay. This latter variety constitutes a large part of the clay in stones of the coal formations.

In the United States siderite occurs at Plymouth, Vt.; Sterling, Mass.; Roxbury, Conn.; Antwerp, Jefferson County, N. Y., and at the Rossie Iron Mines, Saint Lawrence County, N. Y., and in North Carolina. Also in Pennsylvania, Ohio and other States, chiefly as clay iron stones in the Coal measures.

SIDEWINDER, a local name in Arizona for the horned rattlesnake (*Crotalus cornutus*), referring to its sidewise method of progression. See RATTLESNAKE.

SIDI-BEL-ABBES, sē'dē-bĕl-ăb-bās', Algeria, a town in the department of Oran, lies 38 miles south of the town of Oran, on the Mekerra River. It is a modern walled town, and occupies a height rising from a fertile healthy and populous plain. Numerous fountains adorn the town. Esparto grass grows here profusely. There is some trade in hides, alfa, cattle, etc. Pop. 25,000.

SIDIS, Boris, sī'dĭs, American psychologist and psychopathologist: b. government of Kieff, Russia, 12 Oct. 1867. He came to the United States in 1887, was graduated at Harvard University in 1894 and later pursued post-graduate studies there, taking his Ph.D. in 1897, his M.D. in 1908. He was associate in psychology and psychopathology at the Pathological Institute of the New York State hospitals in 1896–1901; in 1901–04 was director of the psychopathological hospital and laboratory of the New York Infirmary for Women and Children; and subsequently practised medicine at Boston and at Brookline, Mass. He is also medical director of the Sidis Psychotherapeutic Institute at Portsmouth, N. H. Author of 'The Psychology of Suggestion' (1898); 'Psychopathological Researches in Mental Disassociations' (1902); 'Experimental Study of Sleep' (1909); 'Philistine and Genius' (1911); 'The Psychology of Laughter' (1913); 'The Foundations of Normal and Abnormal Psychology' (1914); 'Causation and Treatment of Psychopathic Diseases' (1916), etc.

SIDNEY, Algernon, sĭd'nĭ, English statesman and republican, son of the 2d earl of Leicester: b. Penshurst, Kent, 1622; d. London, 7 Dec. 1682. He was educated under the supervision of his father, whom he accompanied on his embassies to Denmark and to France. He served in 1642 as captain of a troop of horse in Ireland, and in the civil war espoused the cause of Parliament. He was promoted colonel of horse in 1645, was returned to the Long Parliament in 1646 as member for Cardiff, and in 1647 was appointed lieutenant-general of the horse in Ireland and governor of Dublin, but was soon superseded and in 1648–50 was governor of Dover. In 1649 he was appointed one of the commissioners for the trial of Charles I, but while he attended three of the preliminary meetings he was not present at the trial and did not sign the warrant. He is frequently quoted as approving the measure, and later admitted his justification of it, but his plan, though not exactly clear, seems to have been the deposition of the king by an agreement of both houses. He incurred the enmity of Cromwell by his opposition, and during the first three years of the Commonwealth he stood aloof. In 1652, however, he was elected a member of the council of state and attended 82 meetings in the four and a half months before the council was dissolved by Cromwell, being particularly occupied with foreign affairs. He protested against the Protectorate of Cromwell and afterward held aloof from public affairs until the restoration of the Long Parliament by the army in 1659, when he resumed his place and was again appointed to the council of state. In that year he was sent as a commissioner to negotiate a peace between Sweden and Denmark, and while engaged in this mission the Restoration took place. Aware that his part in the civil troubles could but bring him into disfavor with the royal party, he remained in exile until 1677, when he was given leave to return to settle his private affairs. The excitement attending the exclusion struggle drew Sidney again into politics and he made several unsuccessful attempts to enter Parliament, although outside of that body he wielded a considerable influence. He vindicated himself from an accusation of being the head of a great non-conformist plot soon after the discovery of the «popish plot,» but his private letters, though written with great caution, show a deep sympathy for the nonconformists and the Scots as well as an invincible hatred for bishops and Roman Catholics. He was engaged in an intrigue with the French Ambassador through whom he endeavored to persuade Louis XIV to aid the establishment of a republic in England and evidently hoped to gain at least the maintenance of the rights of Parliament. He undoubtedly received pecuniary aid to the extent of 1,000 guineas through the French Ambassador, though he evidently used the money for public purposes. He seems to have taken no part in the armed resistance of Shaftesbury in 1682, but in 1683 he formed one of the «council of six» in the «Ryehouse Plot» to organize an insurrection among the Scottish malcontents. He was arrested after its discovery and sent to the Tower, charged with three overt acts of treason, consisting of consultations amounting to a conspiracy to levy war against the king; invitation to certain Scots to co-operate with his plans; and of having written a treasonable libel concerning the lawfulness of deposing kings. The only witness against him on the first charge was the infamous Lord Howard, the second charge was proven unfounded, and regarding the third though his authorship of the incriminating paper was undoubted, yet there was nothing to show that it was intended for publication. The law demanded two witnesses for high treason. The notorious Judge Jeffreys accepted the paper as the second witness required by the law, and on this faulty evidence Sidney was sentenced to death. After a fruitless petition to the king he was executed on Tower Hill. His 'Discourses on Government' exhibit great acuteness, are forcibly written, and contain valuable historical information. They were first printed in 1698, and have been reprinted in 1740, 1751 and 1772. Consult Ewald, A. C., 'Life and Times of Algernon Sidney' (1873); Meadley, G. W., 'Memoirs of Algernon Sidney' (1813); Van Santvoord, G. V., 'Life of Algernon Sidney' (New York 1851); 'Dictionary of National Biography' (London 1888).

SIDNEY, Sir Philip, English soldier, statesman and poet: b. Penshurst, Kent, 30 Nov. 1554; d. Arnhem, Netherlands, 17 Oct. 1586. After studying at Oxford and Cambridge he set off on his travels at 18, visited France, Hungary and Italy. Returning through Germany and Flanders, he arrived in England in 1575. He became a favorite with Queen Elizabeth, who in 1576 sent him on an embassy to Germany. He had a quarrel with the Earl of Oxford, but the queen interposed to prevent a duel from taking place. Sidney, displeased at the issue of the affair, then retired to Wilton in Wiltshire, 1580, and amused himself with the composition of his celebrated pastoral romance, 'Arcadia.' He married Frances, daughter of Sir Francis Walsingham, in 1583. That same year he was knighted. About this time he projected with Sir Francis Drake an expedition against the Spaniards in America, and he had gone to Plymouth to embark on the undertaking, when an express mandate from Elizabeth recalled him to court. Her influence also was exerted to prevent him from being elected king of Poland, «refusing,» as Camden says, «to further his advancement out of fear that she should lose the jewel of her times.» He was subsequently appointed governor of Flushing, and general of the cavalry under his uncle Dudley, Earl of Leicester, who commanded the forces sent to assist the Dutch against the Spaniards. On 22 Sept. 1586, being at the head of a detachment of the English troops, he fell in with a convoy of the enemy marching toward Zutphen. In the rash charge of 500 against 3,000, Sidney received a shot in his thigh, which shattered the bone. An incident that occurred as he was being borne off the field illustrates his character. It is thus recorded by Lord Brooke (Fulke Greville) his biographer: «In which sad progress, passing along by the rest of the army where his uncle the general was, and being thirsty with excess of bleeding, he called for some drink, which was presently brought him; but as he was putting the bottle to his mouth he saw a poor soldier carried along, who had eaten his last at the same feast, ghastly casting up his eyes at the bottle. Which Sir Philip perceiving, took it from his head before he drank, and delivered it to the poor man with these words: «Thy necessity is greater than mine.» His body was carried to England, and after lying several days in state was buried in Old Saint Paul's Cathedral. His brief career, which to many may seem not to justify his great reputation, nevertheless made a powerful impression on English patriotism. So universally was he esteemed that a general mourning for him was observed throughout the whole country. For a month no gentleman of quality cared to appear in London without mourning garb. He was panegyrized by his contemporaries, and the universities issued three volumes of elegies on

his death. "He adorned the paths of love, war, patriotism, religion, all that led through the wide fields of his beautiful, practical chivalry, with the roses and lilies of fragrant, flowery verse." Edmund Goss. His works, besides the 'Arcadia,' consist of the 'Apologie for Poetrie,' later changed to 'Defense of Poesie'; 'Astrophel and Stella'; a collection entitled 'Songs and Sonnets, and other poetical pieces.' None of these was published in his lifetime his great contemporary fame being based on the reports of those to whom his manuscripts were communicated. He is best known for his 'Arcadia,' one of the earliest specimens of the heroic romance, written in mingled prose and verse, the latter exhibiting various attempts to naturalize the measures of Roman poetry, and for the 'Astrophel and Stella' cycle of 108 sonnets and 11 songs.

Bibliography.— Addleshaw, P., 'Sir Philip Sidney' (London 1910); Arber, E., (ed.) Philip's 'Apologie for Poetrie 1595' (ib. 1912); Brunhuber, K., 'Sir Philip Sidney's Arcadia und ihre Nachläufer' (Nürnberg 1903); Cooke, R. (d. 1593), 'The Pedigree of Sir Philip Sidney' (London 1869); Fox Bourne, H. R., 'A Memoir of Sir Philip Sidney' (ib. 1862); Davis, Mrs. S. M., 'The Life and Times of Sir Philip Sidney' (Boston 1859 and 1875); Ely, 'Chaucer, Spenser and Sidney' (1894); Greville, Fulk (1st Lord Brooke, 1554–1628), 'Life of the Renowned Sir Philip Sidney' (London 1816; new ed., Oxford 1907); Grosart, A. B., 'The Complete Poems of Sir P. Sidney' (London 1877); Lee, Sir Sidney, 'Sir Philip Sidney' (in 'Great Englishmen of the 16th Century' series: New York 1904); Marshal, 'Penshurst Castle in the Time of Sir P. Sidney' (1894); Symonds, J. A., 'Sir Philip Sidney' ('English Men of Letters' series, 1886; New York 1906); Wallace, M. W., 'The Life of Sir Philip Sidney' (Cambridge, Eng. 1915); 'Miscellaneous Works' (Boston 1863; London 1893).

SIDNEY LUSKA. See HARLAND, HENRY.

SIDNEY, Ohio, city, county-seat of Shelby County, on the Miami River, the Miami and Erie Canal, and on the Cincinnati, Hamilton and Dayton, and the Cleveland, Cincinnati, Chicago and Saint Louis railroads, about 40 miles north of Dayton and 65 miles west by north of Columbus. It is in an agricultural region, and has considerable manufacturing interests. The educational institutions are a high school, public and parish elementary schools, two private schools, and a public library. Pop. (1920) 8,590.

SIDNEY SUSSEX COLLEGE, Cambridge, England, was founded in 1596 under the will of Lady Frances Sidney, countess-dowager of Sussex, aunt to Sir Philip Sidney. The charter was granted in 1594 by Queen Elizabeth to Henry Earl of Kent and Sir John Harrington, the executors. The present society consists of a Master, 11 Fellows and 36 scholars. There are 10 fellowships, 24 scholarships, and a number of exhibitions. The scholarships and exhibitions connected with the college are: 30 scholarships varying in value from $150 to $250 a year and five exhibitions, besides several prizes. The college was erected on the site of an ancient Franciscan convent. It consists of two courts much defaced by modern alterations. Oliver Cromwell and Thomas Fuller were members of this college. There are eight church livings in the patronage of the college.

SIDON, sī'dŏn, (Heb. *Zidon;* Arabian *Saida),* anciently a city of Phœnicia (q.v.), on the Syrian coast of the Mediterranean, lies midway between Tyre and Beirut. It is surrounded by a wall with two gates. Its chief interest is historical. It was a wealthy city, with an excellent harbor and much commercial enterprise, being specially noted for purple dyes. It was watered by the streams of Lebanon, and many allusions to it are found in secular and Scriptural writings. Sidon was referred to as 'The first-born of Canaan'; Homer alludes to the ingenious Sidonians and their artistic handiwork. The town was famous for its manufactures of glass, linen, purple dye and perfumes. The Sidonians had their own monarch, but it was once subject to Tyre, and later to the Persians. It passed through many vicissitudes, finally passing over to the Moslems (1291). In the 17th and 18th centuries it became the seat of French commerce. It is now called Saidi. Interesting sarcophagi have been found here (now in Constantinople). The present town was stormed by the Allies under Napier in 1840. Pop. 15,000; of whom 10,000 are Mohammedans. See SYRIA.

SIDRA, Gulf of (ancient SYRTIS MAJOR), Tripoli, a wide gulf of the Mediterranean Sea between the main portion of Tripoli and the plateau of Barca. Its coast-line of over 500 miles is beset with shoals and sand-banks, offering no harbor except Bengazi, at the extreme eastern end. See SYRTIS.

SIEBENGEBIRGE, zē'bĕn-gē-bēr'gĕ (Seven Mountains), Germany, a small chain of mountains near the Rhine, in Rhenish Prussia, 20 miles above Cologne. Above the main range rise seven lofty summits, whence the name. These rugged heights are all crowned with ruins of ancient lordly castles of the 12th century. Ölberg is the highest peak (1,522 feet); while the Drachenfels (q.v.) is the more interesting. Cologne Cathedral was built from stones quarried in these Rhenish Mountains. Some of the peaks are ascended by specially built railways. The scenery is romantic and interesting.

SIEBERT, sē'bĕrt, **Wilbur Henry,** American educator: b. Columbus, Ohio, 30 Aug. 1860. He was graduated at Ohio State University in 1888, from Harvard in 1889 and received his A.M. at Harvard in 1890; studied in Germany in 1890–91, was associate professor of European history at the Ohio State University in 1898–1902, since which time he has been professor of that branch. He was secretary of the University Faculty from 1902 to 1906, and acting dean of the College of Arts, Philosophy and Science during 1907–08; also served as lecturer in history at Ohio Wesleyan University during the same year. He traveled in Europe in 1909–10. Is a member of numerous learned and other societies. He has published 'The Underground Railroad from Slavery to Freedom' (1898–99); 'The Government of Ohio' (1903); numerous papers relating to the dispersion of the American Loyalists, and articles on some other subjects, including a 'Report on Collections of Material in English and European History in the Libraries of the United States.'

SIEBOLD, zē'bŏlt, **Karl Theodor Ernst von,** German physiologist and zoologist: b. Würzburg, 16 Feb. 1804; d. Munich, 7 April 1885. He studied at Göttingen and Berlin; in 1840 was made professor of physiology at Erlangen, in 1845 at Freiburg and in 1850 at Breslau. In 1853 he was made professor of physiology and comparative anatomy at Munich, where to his chair were later added duties as professor of zoology and director of the zoological and zootomical cabinet. His contributions to scientific research are suggested by the titles of his monographs: 'Observationes de Salamandris et Tritonibus' (1828); 'Lehrbuch der vergleichenden Anatomie der wirbellosen Tiere' (Eng. trans., 'Manual of Comparative Anatomy of the Invertebrates,' 1848); 'Ueber die Band- und Blasenwürmer' (1854); 'Wahre Parthenogenesis bei Schmetterlingen und Bienen' (1856); 'Beiträge zur Parthenogenesis der Arthopoden' (1871). Consult Hertwig's memorial address 'Gedächtnissrede' (1886). In 1849 he assisted to found the *Zeitschrift für wissenschaftliche Zoologie.*

SIEBOLD, Philipp Franz von, German physician and traveler: b. Würzburg, 1796; d. Munich, 1866. He was a son of a professor of medicine at Würzburg, and there received his education. In 1822 he removed to the Netherlands and became sanitary officer at Batavia, Dutch East Indies. He accompanied the Dutch embassy to Japan in 1823 and remained there until 1830. He made a second visit in 1859–62. His books upon the Japanese, their language, the flora and fauna of the country, etc., did much to make that country known to the world. He published 'Nippon, Archiv zur Beschreibung von Japan' (1832); 'Fauna japonica' (1833); 'Flora japonica' (1835); 'Bibliotheca Japonica' (1833–41); 'Catalogus librorum japonicorum' (1845); 'Isagoge in bibliothecam japonicam' (1841); 'Epitome linguæ japonicæ' (1826–53); 'Floræ japonicæ familiæ naturales' (1851).

SIEGE. Three important elements are necessary to insure the success of a siege. First, the force of the besiegers must be sufficient to overcome the besieged in actual combat, man to man. If this is not the case the besieged, by a sortie, might destroy the opposing works, and drive away the besiegers. The second element is, that the place must be invested; so that no provisions, reinforcements, or other aliment of war can enter. The third element is, that the besiegers be undisturbed from without. For this it is essential that there shall not be a hostile army in the neighborhood; or, if there be, that the operations of the besiegers be protected by a covering army able to cope with the enemy's force in the field. The ancients executed gigantic works to produce these effects. To complete the investment, they built a high and strong wall around the whole fortress; and to render themselves secure from without, they built a similar wall facing outwards, beyond their own position. The first was circumvallation, the second contravallation. It was thus that Cæsar fortified himself while besieging Alexia, and maintained 60,000 men within his ring. In modern warfare, it is considered preferable to establish strong posts here and there round the place, and merely sentries and vedettes between.

The first step toward the reduction of a fortress is to cut off communication of the occupants with the outside world. This is done by a rapid movement of a relatively small force followed by reinforcements sufficient to hold a line entirely around the place and beyond the range of its artillery. This line is called the "Line of Investment," and the belt of territory immediately outside of it occupied by the investment force is called the "zone of investment." Whether this line must be occupied continuously will depend upon its nature. As much must be actually occupied or commanded as could be used by the besieged for exit or entrance. The line of investment is divided into sections, preferably so chosen that a unit of command can be assigned to each.

Troops assigned to a section of the zone of investment begin at once to reconnoiter it and put it in the best possible state of defense. Artificial or accidental features are prepared and strengthened, intrenchments thrown up where required, communications made and improved through and between sections and telegraph and telephone lines established around the zone and to headquarters. Every means must be utilized to gain knowledge of the ground inside the zone. The time which must elapse before the siege material can be brought up will permit a great deal of such work to be done.

The real attack or systematic approach is pushed inward from a few points only of the zone of investment, usually one or two. The side on which these approaches are made is determined by the following conditions: (1) The best communication with the base; (2) The best terrain for battery positions and approaches under natural cover; (3) The most favorable ground for construction and operation of siege railways; (4) The easiest digging; (5) The most important consequences of success.

The first condition is usually controlling, unless one of the others is prohibitory. If the zone of investment is favorable and ample siege railway equipment is available, the attack may be conducted from points somewhat removed from the main terminus of the supply line. The main defensive line of an important fortress consists of a series of detached forts. To breach such a line one fort at least, more often two, must be taken, and during the operation the fire of the one on each side must be kept down. If two forts are to be reduced, the siege consists of artillery work against four and trench work against the middle two of these. When the front of attack is decided the main engineer park is located out of reach of the defenders' artillery, convenient to the front selected and to the main supply line, and connected with the latter by good communications. Here is assembled all the siege material pertaining to engineering operations as fast as it arrives, to be sorted and arranged in convenient shape for selection and forwarding to the front as required. Sites for the main siege batteries are next selected, at moderately long range from the forts, 2,500 to 4,000 yards, and for intermediate parks near them to con-

tain materials for the construction, repair and supply of batteries. These sites are connected by a belt railroad immediately in their rear, and the belt line is connected with the main park at one or more places.

The complete investing force must be heavily reinforced, ordinarily about doubled, before siege operations on any considerable scale are undertaken. The additional force is concentrated along the front of attack, mainly toward its centre. This and the investing force along the front of operations are sometimes called siege troops, and the remainder of the investing force distinguished as investing troops. The siege force should consist of infantry, engineers and artillery in the proportion approximate of 83 per cent, 5 per cent and 12 per cent, respectively, with the proper contingent of the signal and hospital corps and supernumerary engineers and ordnance officers. The total attacking force ranges from two and one-half to four times the strength of the garrison. The siege artillery is disposed in batteries of four pieces or less, dispersed as much as concentration of fire will permit, and sited when possible on the reverse slopes of ridges or hills or behind timber, and employs indirect fire almost exclusively. Though batteries are invisible, the high-angle fire of the defense reaches them, as the enemy's artillery systematically searches all reverse slopes within range, and the effect of shells must be localized by artificial cover. An emplacement for each gun is best.

First Parallel.— When the siege batteries have brought the artillery fire of the defense under control, the first attempt to gain ground to the front is made by opening a trench generally parallel to the line of investment and, if possible, within 1,200 yards of the enemy's main line. During the day the outposts are advanced to or beyond the proposed line, to permit it to be reconnoitered and its bearings noted. At night the attack is pushed more strongly and the enemy driven in as far as possible for the greater safety of the working parties. As soon as it is dark enough for concealment the tracing is begun. Each party consists of one engineer officer, one non-commissioned officer and a private for each 50 yards of line to be traced. Approaches or zigzag trenches must be traced and dug on the same night with the first parallel, connecting it with cover in the rear. There should be at least three such approaches —at right, left and centre. The tracing of approaches for simultaneous digging differs in detail but little from that of the parallel. It is more difficult because the line is broken and greater accuracy is required. The digging of approaches under fire differs from ordinary trench work in that it is done progressively from one end and with the men reasonably protected from fire while doing it. Tracing is dispensed with. Approaches are usually called "saps," the operation of digging them "sapping," and the skilled men "sappers." The end at which digging is in progress is called the saphead.

Single Sap.—A party of one non-commissioned officer and eight sappers in two reliefs work at the saphead. The two leading sappers, Nos. 1 and 2, excavate a trench four and one-half feet deep and just wide enough to work in, throwing the earth to the front of the exposed side. They are protected in front, or on the end of the trench, by a pile of half-filled sand bags, 50 or 60 in number, piled so as to make a parapet two feet high. The sand bags should be smeared with mud so as to show the color of the soil. No. 1, kneeling or crouching, undercuts the end breast a few inches and brings down the earth. He steps back and No. 2 takes his place and shovels the loose earth out. No. 1 returns, throws forward as many sand bags as may be necessary to gain ground, using a fork or rolling them over with his hands. He then undercuts again and the operation is repeated. Nos. 3 and 4 widen the trench two feet and raise the parapet, also forming a berm 12 to 13 inches wide. The rate of advance of a sap is only two to four feet an hour. When half a yard has been gained, Nos. 1 and 2 exchange places, and when a yard is gained the other relief comes in. At each change of reliefs the men who were Nos. 3 and 4 on the last tour take 1 and 2. Casualties are made up from the waiting relief. Generally, unless reduced to less than four men, the detachment must work without reinforcement until the regular change of trench relief. A working party of infantry, 25 feet in rear of the sappers, widens the trench to 10 feet.

Double Sap.— Two parties work parallel to each other, Nos. 1 and 2 leaving a four-foot tongue between them, which is taken out by Nos. 3 and 4. No widening party is required. To prevent enfilade the direction of the trench is changed at right angles as soon as the plunging fire becomes too annoying. After going 25 to 30 feet laterally, the trench turns again to the front, and, after having advanced sufficiently to form a traverse, turns again to the right until it reaches the original line, when it resumes the main direction.

Second Parallel.—The first infantry position established, a second one well advanced is the next objective. It is called the "second parallel" and should be 500 or 600 yards from the enemy's works, or about midway in front of the first parallel. It will develop only the work selected for attack and will thus be shorter than the first. The second parallel, and the approaches to it from the first, may be established in a night, like the first parallel and its approaches, though this will be the exception. With an alert defense the advance from first to second parallel must be by sap. When the heads of the saps are abreast of each other and on the desired line, they may be turned toward each other and run to a connection, forming the second parallel, though, if possible, the work should be expedited by extending parties for simultaneous work.

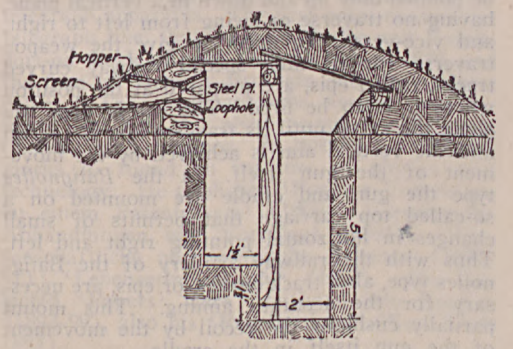
Third Parallel.—This is about halfway from the second parallel to the enemy's works and is in most cases the position of assault, though sometimes fourth and even fifth parallels have been found necessary. At this close range attention is necessary to guard the sapheads, which can be done by machine guns and rifle fire from the second parallel. As the saps advance the returns may be lengthened and turned so as to form demi-parallels. This enables a stronger guarding force to be kept under shelter and well advanced to repulse sorties or to take the offensive if opportunity offers.

Simultaneous Work.— The preceding shows the systematic method of procedure with the least losses. However, if the enemy's artillery is fairly well under control and if the terrain is at all suitable, two or more of the parallels or demi-parallels may be constructed at the same time. This result is obtained by sending working parties at night to the position of the advanced parallel or demi-parallel, and these parties hurriedly construct enough of the parallel to obtain shelter against the enemy's fire. During the day and subsequent nights this parallel is completed and the approaches to it are more quickly constructed because working parties are actively engaged at both ends. It is quite often necessary to construct a fourth and fifth parallel in order to maintain troops near the sapheads and protect the sappers at work.

The developments of the late European War and the methods of conflict in trench warfare due to the advances in science, hand grenades, bombs, obstacles, etc., have brought about important changes in the old methods of siege warfare. The essential difference between capture of entrenched places and victory over extended entrenched fronts lies in the fact that the garrison only of the fortress must be subdued while the nation back of an extended front well entrenched must be conquered. While the garrison of a fortress still retains numbers, food, ammunition and morale it may be possible to capture local strong points, but the garrison will not surrender as long as its power of resistance is not broken; other strong points to the rear will be occupied and the resistance continued. It is thus seen that the real objects of trench warfare are to capture local strong points and to break down the resistance of the enemy, making the following general principles self-evident:

(1) Advance in the open is impossible against enemy fire superiority.

(2) Advance by open sap work is difficult against enemy artillery fire and almost impossible if the enemy has artillery fire superiority.



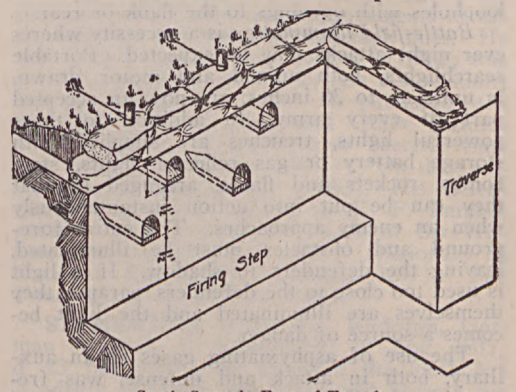
Enclosed Trench.

(3) Advance by mining is effective if the enemy has artillery fire superiority.

(4) An assault against an alert enemy must be preceded by an effective fire of artillery explosive shells to destroy somewhat the enemy trenches and obstacles.

(5) An artillery curtain of fire must be maintained beyond captured enemy trenches in order to assist the successful attackers in defending the captured trenches against counter attack.

The situation on the west front in Europe illustrated the effect of having masses of trained men facing each other on a relatively short line. From the North Sea to the boundary of Switzerland the battle line extended over a distance of 430 miles. The opposing armies had each constructed triple lines of



Sortie Steps in Face of Trench.

trenches, often supplemented in the rear by a double line of underground shelters where the troops in reserve might rest. Many miles of passageways, saps, galleries and zigzags afforded means of communication between the trenches. At a number of points the hostile lines were less than 100 yards apart and grenades of all types were used in great quantities. There were no flanks to turn, the lines were heavily covered by obstacles, and each side having reserves upon reserves, sapping and mining was freely resorted to in order to gain ground.

The observation of the enemy is of the greatest importance in trench warfare. It should give complete knowledge of all the elements of the hostile line and prompt information of any movement of the enemy. It is effected by observation from the ground and observation by aircraft. Observation from the ground is divided into three echelons: (1) observation in front of the firing line from small posts and listening posts. (2) Observation on the firing line by sentinels and lookouts. (3) Obersvation in rear of the firing line, by artillery observers, sentinels and lookouts of the shelters.

The location of the lookout posts and observatories are determined in accordance with a complete plan for each supporting point or sector of defense. No part of the hostile front should be free from observation and the parts of the front favorable for the attack of the enemy should be specially watched. An observatory should be located near the command posts of the commanders of strong points, supporting points and sectors. Those of the last two must have extended views over the whole of the terrain.

During a bombardment, the maintenance of lines of information becomes very difficult, but it must be accomplished by all possible methods, such as: (1) Installing telephone under strong shelters. (2) Using lead-covered cable, buried six feet deep, especially for the

lines connecting the regimental, brigade, division and corps headquarters. (3) Placing rockets in all shelters and observatories where officers or non-commissioned officers are posted. (4) Preparing posts for visual signaling, safe from bombardment and defiladed from view of the enemy. These posts are constructed in shelters similar to those for searchlights and are provided with horizontal loopholes with openings to the flank or rear.

Battle-field illumination is a necessity wherever night attacks may be expected. Portable searchlights, both animal and motor drawn, in units up to 36 inches, are now an accepted part of every army. In addition to these powerful lights, trenches are supplied with storage battery or gas reflector lights, star-bombs, rockets and flares, arranged so that they can be put into action instantaneously when an enemy approaches. The entire foreground and obstacles must be illuminated, leaving the defenders in shadow. If a light is used too close to the defenders' parapet, they themselves are illuminated and the light becomes a source of danger.

The use of asphyxiating gases as an auxiliary, both in attack and defense, was frequent in the European War, but was confined to operations where the combatants were facing each other in trenches under conditions similar to a siege. Chlorine or bromine fumes, or a mixture of the two, were the gases most commonly employed. Chlorine and bromine cause death through strangulation by effect on the bronchial tubes and if death is avoided a long, slow, bronchial illness ensues. *Mustard gas* because of its persistency and effectiveness in low concentrations was used ordinarily, in the European War, to gas large areas. For this purpose accuracy in hitting a given point was not necessary and hence the increase in the dispersion of shots at longer ranges was not taken into account as in the case when it was desired to hit a given point. Likewise the number of guns required to cover a given area was small. The high explosive shell, however, changes this method of firing. Since it is deadly both as a high explosive and as a gas, it can and will be used against small targets. In fact, it will be used exactly as high explosive is used, with the single exception that care must be taken to allow sufficient time for the gas to disperse if it is desired to occupy the places bombarded with the gas.

Mounting heavy artillery on railway cars has in no small degree affected siege operations. The idea of so mounting artillery was not born of the war with Germany. The idea was originally American, the first authenticated record of such employment being by the Union forces at the siege of Richmond in 1863, when a 13-inch cast-iron mortar was mounted on a reinforced flat car. In 1913 the commanding officer of the defenses of the Potomac recommended that artillery of various calibre be mounted on railroad platforms, with ammunition, range-finding and repair cars making up complete units, so that this armament could be quickly transported at any time to the place where most needed. It was then apparent that guns in *fixed positions*, of whatever calibres, violated the cardinal military principle of mobility. Of late railway artillery has come to be as varied in its design as field artillery, each type of railway mount having certain tactical uses, the three types of cannon used being mortars, howitzers and guns. The general types of railway mount adopted are those which give the gun all-around fire (360-degree traverse), provide limited traverse for the gun and allow no lateral movement for the gun on the carriage, but are used on curved track to give the weapons traverse aim. When war was declared against Germany the guns in the United States available for mounting on railway cars are shown in the following table:

NUMBER OF GUNS	Size	Length
	(*Inches*)	(*Calibres*)
12	7	45
96	8	35
129	10	34
49	12	35
6	12	50
150 (Mortars)	12	10
21	14	50

The smaller weapons, such as the 7-inch and the 8-inch guns and the 12-inch mortars, were placed on mounts affording 360-degree traverse. The limited traverse mounts were used for the moderately long-range guns and howitzers. The fixed type of mount was used for long-range guns only, including the sliding railway mounts, such as the American 12-inch and 14-inch sliding mounts and the French Schneider à glissement mounts.

In siege operations, as the result of experience, railway artillery is practically confined to the Barbette, Schneider and Batignolles types of gun mounts. The *Barbette* carriage revolves about a central pintle or axis and turns the gun around with it. In the *Schneider* railway mount the gun and its carriage are fastened rigidly parallel to the long axis of the railway car. Thus the gun itself, independently of any movement of the car, can be pointed only up and down in a vertical plane, having no traverse or swing from left to right, and vice-versa. In order to give the weapon traverse for its aim, special railway curved tracks, called epis, are prepared at the position where it is to be fired. The car is then run along the curve until its traverse aim is correct and the vertical aim is achieved by the movement of the gun itself. In the *Batignolles* type the gun and cradle are mounted on a so-called top carriage that permits of small changes in horizontal pointing right and left. Thus with the railway artillery of the Batignolles type, also, track curves, or epis, are necessary for the accurate aiming. This mount partially cushions the recoil by the movement of the gun itself in the cradle.

While siege operations are largely modified by the advent of military aeronautics, the changes are not great because of the limited weight that the largest airship can carry. The effects of the largest bombs are less terrifying and important than those of the enormous number of gun projecticles, which are thrown with greater accuracy and usually from guns that cannot be seen by those attacked or besieged.

EDWARD S. FARROW,
Consulting Military and Civil Engineer.

SIEGE ARTILLERY. See ARTILLERY.

SIEGE GUN. See ARTILLERY; FORTIFICATIONS.

SIEGEN, zē'gĕn, **Ludwig von,** German-Dutch inventor: b. Utrecht, 1609; d. Wolfenbüttel, 1680. He was a lieutenant in the Hessian army and invented the art of mezzotint engraving which was learned from him by Prince Rupert and so introduced into England. His first work was a portrait of Amelia Elizabeth, mother of the landgrave of Hesse (about 1640).

SIEGEN, Germany, Prussia, a town in the province of Westphalia, on the Sieg River, 47 miles east of Cologne by rail. Two castles, belonging to the period of the Principality, are in this town, several Protestant and Catholic churches, a monument to William I and a bronze bust of Bismarck. It has important mining and manufacturing interests and is the centre of the mining industry of southern Westphalia. It has large tanneries, foundries, factories for cloth, linen, soap, leather and paper, etc. It is on the line of several railways. There is a school of mining and a real gymnasium. Siegen is supposed to be the birthplace of Rubens. Pop. 27,300.

SIEGFRIED, sēg'frēd (Ger. zēg'frēd). See NIBELUNGENLIED.

SIEMENS, zē'mĕns, **Ernst Werner von,** German engineer and electrician: b. Lenthe, Hanover, 13 Dec. 1816; d. Berlin, 6 Dec. 1892. He entered the Prussian artillery in 1834 and took out his first patent in 1842 for a process of silver and gold electro plating. In 1842 he went to England with his brother, Karl Wilhelm, to establish the business known there by the firm name of Siemens Brothers. In 1844 he took charge of the artillery workshops in Berlin. He aided in developing the telegraphic system in Prussia, and discovered the insulating properties of gutta-percha, which is utilized in underground and submarine cables. He left the army in 1849 and devoted his energies to electrical business, particularly the construction of telegraph apparatus. The first great continental telegraph line, that between Berlin and Frankfort-on-the-Main, was built by him in 1849, and the firm of Siemens Brothers laid six Atlantic cables. The pneumatic-tube system was invented by him and also various modifications of self-acting dynamos. In 1886 he gave 500,000 marks to found an institute of physics and technology. He published 'Positive Vorschläge zu einem Patentgesetz' (1869); 'Gesammelte Abhandlungen und Vorträge' (1881); 'Wissenschaftliche und technische Arbeiten (1889–91); 'Lebenserinnerungen' (1892). His collected 'Papers' were translated into English (1892–99), also his 'Recollections' (New York 1893).

SIEMENS, SIR **Karl Wilhelm,** German-English physicist and inventor: b. Lenthe, Hanover, 4 April 1823; d. London, 19 Nov. 1883. He was educated at the gymnasium at Lübeck, the polytechnic school at Magdeburg and the University of Göttingen. At 19 he became a pupil in the engine works of Count Stolberg, and a year later visited England for the purpose of introducing a method of electro-plating, the joint invention of his brother Werner and himself. In the same year the brothers invented a differential governor for steam-engines, and in 1844 he again went to England to patent this invention. From that time he settled in England, becoming naturalized in 1859. Among the many other inventions with which he, in combination with his brothers, must be credited, are the regenerating gas furnace for metallurgical purposes, the process of making steel and iron direct from ore, which has revolutionized the steel and iron trades, and improvements in the manufacture and laying of telegraph lines. He was elected to the Royal Society in 1862; was one time president of the British Association; and was knighted in 1883. He published 'On the Utilization of Heat and Other Natural Forces' (1878); 'The Dynamo Electric Current and its Steadiness' (1881); 'On the Conservation of Solar Energy' (1883). His 'Scientific Works' were edited by E. F. Bamber (1888). Consult Pole, Dr. 'Life of Sir William Siemens' (London 1888); 'Dictionary of National Biography' (London 1897); *The Times* (London, 20 Nov. 1883).

SIEMERING, zē'mĕr-ĭng, **Rudolph,** German sculptor: b. Königsberg, 10 Aug. 1835; d. 23 Jan. 1905. He attended the local Art Academy in youth and afterward became the pupil of Blaser in Berlin. For the decoration of Königsberg University he furnished medallion portraits of its learned men. In 1860 he produced his 'Penelope' and in 1860 a sitting figure in marble of King Wilhelm for the Exchange in Berlin; and a terra-cotta statue of Leibnitz for the Academy of Science at Perth, productions remarkable for realistic modeling and imposing expression. In 1871 he executed the masterly relief 'Uprising of the People at the Summons of their King'; and the following year a design for the Goethe monument. His next work was the statue of Frederick the Great for Marienburg. The greatest of his works, however, was the war monument in the market place at Leipzig, 'Germany,' as an armed heroine. Worthy also of special notice was the sitting statue of Emperor William I with the four colossal equestrian figures — King Albert of Saxony, Emperor Frederick, Bismarck, Moltke and eight figures of soldiers. He was the author of the colossal equestrian statue of Washington whose pedestal is enriched with reliefs and accessory sculptures. This impressive monument was unveiled in Fairmount Park, Philadelphia, May 1897. Siemering's group, 'Saint Gertrude Hospitably receiving a Traveling Scholar,' was finished and set upon the Bridge of Saint Gertrude at Berlin in 1896. He was also the author of numerous portrait busts.

SIEMIRADZKI, syĕm-ĭ-răz'kĭ, **Henryk,** Polish painter: b. near Kharkov, Grodno government, 15 Nov. 1843; d. 1902. He studied art in the Academy of Saint Petersburg and after a sojourn in Munich, fixed his studio in Rome. Among his best canvases are 'Nero's Torches' (1876) now in the National Museum, Cracow; 'The Vase or the Slave' (1879); 'The Amulet-Seller' (1888); 'Christ Stilling the Waves'; 'The Sword Dance' (1880); 'Phryne at Eleusis' (1889), in the Alexander Museum, Petrograd; 'Christ with Martha and Mary' (1886). He also decorated with much skill two ceilings in the Netchaiev Palace of Petrograd and several churches of Cracow and Moscow.

SIENA, sē-ā'nā, or **SIENNA,** sē-ĕn'na, Italy, (1) Capital of a province of the same name and an archiepiscopal see, 61 miles south of Florence, occupies a lofty site 1,100 feet above sea-level on the southern frontiers of Tuscany. It is enclosed by an Etruscan wall with nine gates, has a strong citadel and is in all respects a typical Italian town; the Piazza di Vittorio Emanuele is historical. Siena outranks all the other cities in its art history from the 13th to the 16th centuries (excepting Rome and Florence). This art is largely represented in its public buildings; the fine Gothic cathedral (13th century) has a remarkable façade inlaid with marbles of various colors and with profuse decorations, after a design by Pisano. The interior contains a famous pulpit by the same sculptor (1274); a mosaic pavement inlaid with biblical scenes and magnificent choir stalls of fine renaissance; 6 paintings by Michelangelo; bronze statue of John the Baptist, by Donatello; a high-altar by Peruzzi, etc. In the library are the celebrated frescoes by Pinturicchio and the finely illuminated choir-books, resting on elaborately carved desks. On the south side of the cathedral is the antique marble group of the three graces, found (1460) in the Palazzo Colonna at Rome. Beneath the cathedral the Church of San Giovanni is enclosed as a crypt. It was formerly a baptistery and contains some fine baptismal fonts and bronze basreliefs. The other most interesting churches are San Domenico, Fontegiusta, Santo Bernardino, Fonte Gaja, San Agostino, the Collegiata di Provenzano, etc., all rich in *chef d'œuvres* of painting and sculpture by Sienese and other Italian artists. The city contains numerous and splendid palaces, municipal offices and public institutions, including the Palazzi Tolomei (1205) and Buonsignori; Palazzo del Governo, containing valuable archives (52,000 manuscripts); Palazzo Spanocchi (now post office and telegraph bureau); the Loggia dei Nobili (in imitation of the Loggia dei Lanzi at Florence), and the Palazzo Pubblico. The Instituto dei Belli Arti contains a fine collection of paintings of the early Sienese school, from the dismantled monasteries and modern works; the Public Library contains 84,000 volumes and 5,000 manuscripts; the Accademia dei Fisiocritici contains a museum of natural history; the University (1321) has limited facilities and but two faculties; there are a lyceum, a technical school, a theatre and many prosperous charitable institutions and hospitals. Fonte Gaia, Fontebranda — immortalized by Dante — and Fonte Nuova are among the beautiful fountains and at the southeast stands the Benedictine convent "Monte-Oliveto Maggiore" on the summit of Mount Acorur, with fine frescoes. The Lizza promenade is much frequented. The manufactures are unimportant, weaving being the most essential; trade consists chiefly in common and fine marble, cloth, furniture, silk and velvet.

Its history is somewhat mythical as to origin and of ancient date. From the Etruscans — its founders — it passed into the hands of the Romans and then to the Lombards. The people rebelled against the rule of the nobles in the 12th century and warred with Florence in that and the succeeding century and in the 14th century they resigned their liberties to the Duke of Milan, after many years of internal strife; especially memorable is the strife of 1480, when Pandolfo Petrucci acquired practical control of the state. Later, the city placed itself under the protection of Charles V of Spain, thus acquiring a burden of tyranny, while hoping to be freed from a petty despotism, and became the scene of frequent riot and bloodshed. The Sienese then entered into treaty with France. Finally, after renewed hostilities by Spain and Cosimo I de Medici, Siena was reduced and annexed to Tuscany. In 1859, the city was the first to vote for the monarchy of Victor Emmanuel II, which led to the union of the Italian states. Pop. 41,673. Consult Douglas, L., 'History of Siena' (New York 1903); Gardner, E. G., 'Story of Siena' (London 1913); Hutton, Edward, 'Siena and Southern Tuscany' (New York 1912); Schevill, Ferdinand, 'Siena: Story of a Mediæval Commune' (ib. 1909). The Province of Siena, in the grand duchy of Tuscany, covers an area of 1,471 square miles and is divided into two districts, Montepulciana and Siena. There is an important agricultural industry; also an extensive silk industry. The chief products are wheat, wine and olives. The province is traversed by the Florence-Rome Railway which branches off at Asciano toward Siena. Pop. 244,850.

SIENKIEWICZ, syĕn-kye'vĭch, **Henryk,** Polish novelist: b. Vola Okrzeyska, Siedlce, 4 May 1846. He was educated at the University of Warsaw, published some critical articles in 1869, was for a time editor of *Slovo,* a journal of Warsaw, and in 1870 sent to press his first work of fiction, 'Na Marne,' rendered into English by the official translator, Jeremiah Curtin (q.v.), as 'In Vain' (1899). In 1876 he came to the United States, where for a time he remained in California. He traveled also in central Africa in 1891. Among his chief works accessible in English are the following, all by Curtin except where otherwise specified: 'The Deluge' (1891); 'With Fire and Sword' (1893); 'Without Dogma' (Young) (1893); 'Pan Michael' (1894); 'Quo Vadis?' (1897), with scene in the Rome of Nero, his best-known book; 'Let Us Follow Him' (1897); 'So Runs the World' (the Soissons) (1898); 'On the Bright Shore' (1898); 'Sielanka and Other Stories' (1898); and 'Knights of the Cross' (1899). Perhaps his best work is to be found in 'With Fire and Sword,' 'The Deluge,' and 'Pan Michael.' Quo Vadis has been translated into nearly every modern language and has been dramatized frequently with great success. In 1905 he received the Nobel prize in literature. Consult Phelps, W. L., 'Essays on Modern Novelists' (New York 1910).

SIENNA. A brownish-orange-yellow pigment consisting of clay colored by iron and manganese oxide.

SIERRA, Justo, Mexican educator and statesman: b. Campeche, 26 Jan. 1848. At the age of 23 he became a lawyer and advocate. After the downfall of President Lerdo, Sierra retired from politics, but soon re-entered public service as a member of the lower branch of the federal congress. In this position his education, oratorical abilities and intense loyalty soon won for him great influence and prominence. He was called from Europe, where he was serving on an important mission, to become secretary of public instruction. A number of his historical and educational works are used as textbooks in the National Preparatory School and in other institutions of learning.

SIERRA LEONE, sē-ĕr'rā lē-ō'nē or lē-ōn' (Sp. lā-ō'nā), West Africa, a British colonial territory, consisting of a colony proper and a more extensive protectorate. The colony consists of the peninsula of Sierra Leone, about 25 miles long and 12 miles broad, of Sherbro Island and a few islets and of all the coast strip between French Guinea and Liberia; total area, about 4,000 square miles. The capital, Freetown, is at the northwest extremity of the peninsula. The protectorate extends inland so as to have French Guinea on the north, Liberia on the east and southeast; area, about 30,000 square miles. The surface near the shore, though sometimes rocky, is generally flat, but in the interior are many hills and mountains, varying in height from 500 to 3,000 feet. Some parts are low and swampy; most parts are well watered. The soil, of which only a comparatively small portion is under regular cultivation, is fertile, growing excellent crops of rice, Indian-corn, yams, plantains, pumpkins and cassava. Sugar, coffee, indigo, ginger and cotton also thrive well. The fruits include the boabab, cocoanut, banana, pineapple, orange, lime, guava, papaw, pomegranate, etc. The forests are extensive and the trees in them are often so magnificent as to be converted into canoes capable of containing 100 men. The principal livestock are pigs and goats. Poultry also, particularly guinea-fowls, are very abundant. The fisheries both on the coast and in the rivers are productive. The chief industrial establishments are those in which the palm-oil is extracted and prepared. Boat-building is also carried on to some extent, native cloth is woven, and leather is dressed on a small scale. Trade is carried on chiefly with Great Britain. The total value of imports for the year 1915 was $6,278,775; of exports, $6,273,105. The total tonnage of vessels entered and cleared for the same year was 1,635,119 tons, of which 1,520,998 were British. The principal articles of import are cottons, wines and spirits, tobacco, apparel, haberdashery, flour, salt, etc.; of exports, palm-kernels, kola-nuts, gum copal, ginger, benniseed, etc. The total revenue in 1915 was $2,522,120, and the expenditure amounted to about $2,733,855. The strongest religious bodies are the Church of England and the Wesleyan Methodists. The number of white inhabitants is only about 700. Education is denominational, but is assisted by state aid. There are some 112 elementary schools, the number of pupils on the rolls being over 7,000. There is a college at Furah Bay for the education of native ministry, supported by the Church Missionary Society and affiliated to Durham University; secondary schools for boys and for girls at Freetown, a technical school, etc. Sierra Leone was discovered by the Portuguese in 1463 and first became a British colony in 1787. Soon after, a company was formed with the humane intention of making it a home for free negroes, and proving by their means that colonial products could be raised without slave-labor. In 1800 a grant of the peninsula was made to the company, but in 1807 the company ceded all their rights to the Crown. Since then the position of Sierra Leone has varied at different times. Its affairs are now administered by a governor and an executive council of several official members, with a legislative council. One great obstacle to its prosperity is the deadly nature of its climate, particularly to Europeans; but its progress, though slow, has been steady. The natives can live in comfort with little exertion. Freetown (q.v.) is now a fortified coaling station and centre of trade. A railway runs from Freetown to Pendembu, near the Liberian frontier, a length of 227½ miles. From Boia Junction, 64 miles from Freetown, a branch line runs to Kamabai, a distance of 104 miles, and a further extension to Baga is contemplated. Pop. 75,572; with protectorate, about 1,400,000.

Protectorate, The.— By an order in council of 7 March 1913 all the territories, not being portions of the colony of Sierra Leone, to between the sixth and tenth degrees of north latitude and the tenth and fourteenth degrees of west longitude and beginning at the extreme southerly point of the colony on the Anglo-Liberian boundary were included in the Protectorate of Sierra Leone. The governor and commander-in-chief for the time being of the colony of Sierra Leone is also the governor of the Protectorate. Authority is given to the legislative council of Sierra Leone by ordinance, to exercise and provide for giving effect to the powers and jurisdiction acquired by the Crown. The area of the protectorate is 27,000 square miles and the population numbers 1,327,560. The territory is divided into five districts each of which is under a European commission. There are circuit courts in all chief centres of population, also district commissioners' courts, chiefs' courts for native cases and combined courts for small debts and certain misdemeanors between natives and non-natives. Imports comprise, cotton goods, spirits, hardware and tobacco; exports, palm kernels, kola nuts and palm oil. There are Mohammedan and mission schools. There is a government school at Bo, for the sons and nominees of native chiefs. It now has 113 pupils.

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SIERRA MADRE, mā'drā (Sp. mā'thrā), (1) A range of mountains in southern California, in Los Angeles and adjoining counties on the northeast. (2) A range in the southern part of Wyoming in Carbon County. (3) The range in Mexico which borders the plateau on the west. It is a continuation of the range on

the western border of the Great Salt Lake Basin in the United States. In Mexico, the range is much broken; the peaks, except a few, do not exceed 10,000 feet in height. This range is sometimes called Sierra Madre del Pacifico. In southern Mexico is a range called Sierra Madre del Sur. (See MEXICO). (4) One of the three principal mountain ranges of the island of Luzon, Philippines. It begins at Caraballo de Baler, in the southeastern part of the province of Nueva Ecija and extends northeast to Cape Engaño, the northeast point of the island. A branch of this range called Mamparán starting at Caraballo Sur, in the northern part of Nueva Ecija, extends to the north. The highest peak is Mount Moises.

SIERRA MADRE DEL PACIFICO. See SIERRA MADRE.

SIERRA MADRE DEL SUR. See SIERRA MADRE.

SIERRA MORENA, mō-rē'nä, Spain, an irregular mountain chain, about 380 miles in extent, which forms the watershed between the Guadiana and Guadalquivir rivers, and extends between the south and the northern boundaries of Andalusia, for which reason it is sometimes known as the Andalusian System. This system consists of three distinct parts. The eastern division through which the railroad and highway pass on the way to Madrid presents a magnificent landscape. Here is the celebrated pass, Puerto de Despeñaperros. The highest summits are Cerro Estrella (5,500 feet), in the west, and in Estremadura, the Tudia. On the watershed, between the Murtiga and the Huelva near the source of the Adiel, the water fall is great; many chestnut trees and cork oaks are found; also extensive marble quarries. The range abounds in copper, zinc, quicksilver, iron, etc.

SIERRA NEVADA, a range of mountains in eastern California, separating the interior basin of Nevada from the valley of California. It is in the form of a tilted plateau from 50 to 100 miles wide and extending from northwest to southeast for about 450 miles. In the south it runs westward and is united by Mount San Bernardino with the Coast Range, which runs parallel with the Pacific. It is the source of a multitude of rivers which swell the Sacramento and San Joaquin. Its northern continuation into Oregon is known as the Cascade Range. The crest has an average elevation of over 11,000 feet. The range falls very abruptly on the east along a great fault line and slopes gradually on the western side. Its rocks consist of schists, slates, granite and diabase covered with volcanic rocks of the Tertiary period. The range was first folded at the close of the Jurassic. The highest peaks are on the eastern margin near the southern end. Mount Whitney, the highest point in the United States proper, reaches an altitude of 14,502 feet. Other peaks with their altitudes are Fisherman Peak, 14,448 feet; Mount Corcoran, 14,093 feet; Mount Brewer, 13,886 feet; Mount Kaweah, 13,752 feet; Mount Lyell, 13,090 feet. There is perpetual snow on the higher points and there are a number of small glaciers. Coniferous forests cover the range to about 8,000 feet and on the west slope are deciduous trees and at a certain elevation above these are found the famous big trees (*Sequoia gigantea*). The chief passes are the Truckee, 7,200 feet, and crossed by the Central Pacific; the Beckworth, 5,190 feet; the Walker, 5,320 feet; Tehachapi, 3,830 feet, and crossed by the Southern Pacific. Consult Muir, John, 'Mountains of California' (New York 1911); id., 'My First Summer in the Sierra' (Boston 1911).

SIERRA NEVADA, nä-vä'thä (Spanish, "snowy range"), (1) The loftiest mountain range in Spain. It extends east and west through Andalusia and Granada, terminating on the Mediterranean shore, where it forms several promontories. To the east it passes gradually into the lower plateau regions. It has numerous spurs enclosing deep valleys. Mica slate is its chief constituent, and vegetation is scanty except in the lower valleys. Snow remains on the peaks the greater part of the year, and there are several permanent glaciers, those on the Veleta being the southernmost in Europe. Its highest peak, Mulahacen (11,678 feet), is covered by perpetual snow; Veleta, next in height, has an elevation of 11,378 feet. These high peaks are penetrated by deep valleys or gorges, with here and there small, icy lakes, of which the Corral de Veleta extends into an immense glacier 8,580 feet high. The loftiest pass is the Collado de Veleta (9,900 feet), where the snow line is from 8,970 to 9,300 feet high.

SIEYÈS, sē-ā-yäs, **Emmanuel Joseph** (the Abbé Sieyès), French statesman: b. Fréjus, 3 May 1748; d. Paris, 20 June 1836. He began his studies at the University of Paris, and when the Revolution broke out he took an active part in furthering its progress, and wrote three pamphlets on the mode in which the three estates were to vote, whereby he was brought into very general and favorable notice. With him originated the idea of a new geographical division of France into departments, arrondissements and communes. He also took an active part in the formation of the new constitution, and was in 1791 member for the department of the Seine. In 1792 he was deputy for the department of the Sarthe; but generally contented himself with merely recording his vote. During the Reign of Terror he withdrew into the country, but on the downfall of Robespierre he returned to the convention and took an active part in public measures, more especially foreign affairs, conducting several important negotiations with other states. In 1798 he went on a mission to Berlin, and succeeded in securing the neutrality of Prussia. On his return in 1799 he succeeded Rewbell as a member of the Directory, and shortly after succeeded in displacing three of his colleagues, so as to obtain a majority favorable to his views. He afterward, with the assistance of Fouché, closed the Jacobin Club. This measure made him very obnoxious to the extreme Republican party, and under the conviction that faction was now to be kept down only by force he began to look out for a military leader. He thought of several, but fixed at last on Bonaparte. The revolution of the 18th Brumaire was the result; but Sieyès, who hoped he had only obtained a coadjutor, soon learned that he had subjected himself to a master. He did not, however, retire unrewarded, but proved that the simplicity and disinterestedness of which he had boasted were more nominal than real, by

obtaining, along with the title of count, grants of lands and other property to the value of at least $250,000. He wrote 'Reconnaissance et exposition des droits de l'homme et du citoyen' (Paris 1789). Consult Boulay, 'Théorie constitutionelle de Sieyès' (Paris 1836); Beauverger, Edmond de, 'Etude sur Sieyès' (in 'Tableau historique du progrès de la philosophie politique' (ib. 1858); Bigeon, 'Sieyès' (ib. 1873); 'Cambridge Modern History' (Vol. VIII, New York 1904); Neton, A., 'Sieyès, 1746–1836, d'après des documents inédits' (Paris 1900); Mignet, F. A. L., 'Notices et mémoires historiques' (Vol. I, Paris 1843).

SIFFLEUR, an American ground squirrel, nearly equalling a rabbit in size, common in the Rocky Mountain region. It is so called from the loud eerie whistle with which it wakes the echoes of the crags about the lone pastures above timber line, where it makes its home; it was of great service to the mountain Indians. See MARMOT.

SIFFU, sēf-foo', or **SIBBÚ,** sēb-boo', a river of the island of Luzon, Philippines. It rises in the eastern part of the province of Bontoc and flows south and east through the province of Isabela to the Rio Grande de Cagayan; it is one of the most important tributaries of the Cagayan in Isabela.

SIFTON, Arthur Lewis, Canadian jurist and statesman: b. Saint John's, Ontario, 26 Oct. 1858; d. Ottawa, 21 Jan. 1921. He was educated at Wesley College, Winnipeg, and at Victoria University, Cobourg. He settled in the Northwest Territory in 1875 and in 1883 was called to the bar. He served in the legislature of the Northwest Territory in 1899–1903; was treasurer and commissioner of public works in the ministry of F. W. G. Haultain (q.v.); and in 1903–05 he was chief justice of the Supreme Court of the Northwest Territory. Upon the establishment in 1905 of the province of Alberta he became chief justice of its Supreme Court, and in 1910–17 he was premier of that province.

SIFTON, Sir Clifford, Canadian lawyer and statesman: b. Middlesex County, Ontario, 10 March 1861. He was graduated at Victoria University, Cobourg, in 1880, settled in Manitoba and in 1882 was called to the bar. He sat in the Manitoba legislature in 1888–96, was attorney-general in the Greenway ministry in 1891–96 and in 1896–1911 he was Minister of the Interior in the Laurier administration of Ottawa. His most notable work was in the promotion of immigration to Canada. He was an opponent of separate schools in Manitoba; and in 1911 left the Laurier Cabinet because of his opposition to the reciprocity treaty then under discussion between the United States and Canada.

SIGEBERT OF GEMBLOUX, sezh'bèrt' ov zhäṅ'bloo', Belgian mediæval chronicler: b. Brabant, c. 1030; d. Gembloux, 5 Oct. 1112. He early became a monk in the Benedictine abbey of Gembloux, where, with the exception of a period as a teacher at Metz, he passed all his life in teaching, and writing the works that have perpetuated his name. Chief of these is 'Chronographia,' covering history from 381 to 1111 A.D. It appears in 'Monumenta Germania historica Scriptores' (Vol. VI, ed. with introd. by L. C. Bethmann). Other works are 'Vita Sigeberti III regis Austrasiæ,' a life of the Frankish King Sigebert III; 'Gesta abbatum Gemblacensium,' a history of the early abbots of Gembloux to 1048; and the hagiographical biographies, 'Vita Deoderici, Mettersis episcopi,' a life of Bishop Dietrich of Metz, d. 984, who founded Saint Vincent's Abbey in that city; and 'Vita Wicberti,' a life of Wicbert or Guibert, d. 962, who founded the abbey of Gembloux. Consult Hirsch, S., 'De vita et scriptis Sigiberti Gemblacensis' (Berlin 1841); Molinier, A., 'Les Sources de l'histoire de France' (Vols. II and V, Paris 1902–04); Wattenbach, W., 'Deutschlands Geschichtsquellen' (Vol. II, Berlin 1894).

SIGEL, sē'gĕl, **Franz,** American military officer: b. Sinsheim, Baden, 18 Nov. 1824; d. New York, 21 Aug. 1902. He was graduated from the military school at Carlsruhe in 1843 and was commissioned lieutenant in the army, but resigned in 1847. In 1848 he raised a corps of volunteers to serve in the Baden insurrection and became commander-in-chief of the revolutionists. Arrested by the Swiss authorities in 1851 he escaped and in 1852 came to the United States. He settled in New York and conducted there a military magazine *Die Revue,* removing in 1857 to Saint Louis where he established a similar paper and also engaged in teaching. At the outbreak of the Civil War he organized a regiment for the Federal army and went to the front; participated in the battles of Carthage, Dug Springs and Pea Ridge; and in May 1861 was commissioned brigadier-general of volunteers. He was promoted major-general in 1862 and assigned to a corps in the Army of Virginia, which he commanded in the series of operations from Cedar Creek to the second battle of Bull Run. He was appointed to command the Western Pennsylvania Reserves in 1863 and in 1864 was transferred to the command of the Department of Western Virginia, successfully defending Maryland Heights against General Early's raid in July 1864, though his force was but 4,000 men against 15,000. He resigned his commission after the war, was editor of the Baltimore *Wrecker* in 1865–67 and later removed to New York. He was appointed collector of internal revenue in 1871 and elected registrar of New York in the same year. In 1868 he was appointed pension-agent, and later edited the *New York Monthly,* a German-American publication, and was the author of various essays on military subjects.

SIGERSON, George (pseud. ERIONNACH), Irish poet, physician, botanist and educator: b. Holy Hill, County Tyrone, about 1839. He was educated at Queen's College, Cork, and later studied in Dublin and Paris. He was professor of botany at the Catholic University, Dublin, and was afterward professor of zoology at University College, Dublin. He exercised a profound influence over the Celtic revival, is an authority on Irish literature and history and has written ably on Irish land tenure, political prisoners and kindred subjects for the *Irishman,* the *Nation* (Dublin) and the *Harp.* He performed a notable service to Irish letters in his translation of Celtic poetry, 'The Poets and Poetry of Munster' (1860) and 'Bards of Gael and Gall' (1897; 2d ed., 1907). His own

verse is well known and is included in the modern Irish anthologies.

SIGHING, an act of respiration beginning in an involuntary, often sudden, sometimes prolonged inspiration, in which the diaphragm descends; the expiratory act which follows, and which constitutes the "sigh," being caused by the recoil of the chest-walls and lungs and by the action of the abdominal muscles. Sighing usually illustrates simple respiration as modified by mental or emotional conditions or by some factor of sensation. During strained attention, as when listening to a thrilling speaker, or witnessing an exciting scene, the respirations become very short and quickly recurring, with an occasional long sighing inspiration at intervals.

SIGHT. See Eye; Senses; Vision.

SIGHT, Defects of. See Vision, Defects of.

SIGILLARIA, sĭj-ĭ-lā'rĭ-a, a genus of fossil plants found in great abundance in the coal measures. The plant occurs in the form of compressed stems attaining a height of 40 to 50 feet, and a breadth of five feet. The stem is seldom found preserved so as to show any structure or even its cylindrical form; it generally occurs as a double layer of coal, showing on the outer surfaces longitudinal furrows due to the arrangement of the leaves on the stem, and at regular intervals the scars produced by the bases of the leaf-stalks. The roots are found preserved in the shale which forms the floor of all coal seams; they were originally supposed to be distinct plants, and have received the generic name of *Stigmaria.* No foliage of any kind has been found connected with the trunk. Some suppose Sigillarias to be allied to tree-ferns, others to *Coniferæ.* King says that if in imagination we delineate a channeled stem of any height between 12 and 100 feet, crowned with a pendant fern-like foliage, furnished with wide-spreading fibrilled roots, and growing in some densely-wooded swamp of an ancient Mississippi, we will then have formed a tolerably close restoration of a sigillaria growing in its true habitat.

SIGISMUND, sĭj'ĭs-mŭnd (Ger. zē'gĭs-moont), emperor of Germany, son of Charles IV: b. 14 Feb. 1368; d. Znaim, Moravia, 9 Dec. 1437. He succeeded to the margraviate of Brandenburg on the death of his father, Emperor Charles IV, in 1378, while his brother Wenceslaus, king of Bohemia, succeeded to the throne. By his marriage to Mary, heir of Louis the Great, king of Poland and Hungary, he became heir-apparent to the throne of these two countries, but on the death of Louis in 1383 the Poles chose Hedwig, Louis' younger daughter, for their queen, and the regency of the Hungarian throne was seized by Charles Durazzo, while Mary was kept in captivity. Sigismund rescued her and on the murder of Durazzo was crowned king of Hungary in 1387. His war against the Turks, though supported by the French and German chivalry, resulted in a disastrous defeat at Nicopolis in 1396, and Sigismund was compelled to escape into Greece. On his return to Hungary in 1401 he found his queen dead, his throne occupied by Ladislaus of Naples and his brother Wenceslaus maintaining with difficulty his throne in Bohemia, having been deposed in Germany. He was imprisoned by Ladislaus, but escaped, raised a large force and in 1403 succeeded in expelling Ladislaus and subduing the kingdom. In 1411 he was elected emperor of Germany and was crowned Holy Roman emperor at Aix-la-Chapelle in 1414. During the Council of Constance in 1414 he allowed John Huss to be put to death for heresy, an act which resulted in the Hussite War. Wenceslaus died in 1419, but it was not until 1431, when Sigismund signed the compact with the Council of Basel, that the Hussites would permit the acknowledgment of his succession to the Bohemian throne. He was crowned emperor in Milan in 1431, and his coronation was repeated in Rome in 1433. The Luxemburg dynasty became extinct at his death, as he was succeeded by his son-in-law, Albert II of Saxony. Consult Aschbach, J. G., 'Geschichte Kaiser Siegmunds' (4 vols. Hamburg 1845); Main, A., 'The Emperor Sigismund' (London 1903); Schiff, Otto, 'Kaiser Sigmunds italienische Politik' (Frankfort 1910); Windecke, E., 'Denkwürdigkeiten zur Geschichte des zeitalten Kaiser Sigmund's' (Berlin 1893).

SIGISMUND I, surnamed The Great, king of Poland: b. 1 Jan. 1467; d. Cracow, 1 April 1538. He was the youngest son of King Casimir IV, and in 1506 succeeded his brother Alexander on the throne of Poland. The war with the Russians, which was urged forward by the Lithuanian prince Michael Glinski, gave him employment throughout his whole reign. The peace of Poland was also disturbed by inroads of the Tartars and of the Wallachians. On the other hand Poland was increased by the addition of Masovia. By his toleration the Reformation spread in Poland, and Protestantism became the prevailing religion both in Grand Poland and Polish Prussia. Sigismund, after the death of his wife, Barbara Zapolika, married a daughter of the waywode of Transylvania and Bona Sforza of Milan. This marriage was the cause of many misfortunes to the country. The Italian soon secured for herself an influence in the government, sold the public offices and at last placed Piotr Kmita at the head of the administration, which acts contributed to destroy the popularity of the king. Under Sigismund the golden age of ancient Polish literature began.

SIGISMUND II, Augustus, king of Poland: b. 1 Aug. 1520; d. Knyszyn, 14 July 1572. He was son of Sigismund I, and was appointed king in 1529, in the lifetime of his father, and in 1544 obtained the government of Lithuania. His mother, Bona Sforza, allowed him to grow up in luxury and effeminacy that she might be able to continue her influence during the government of her son; but upon his accession he disappointed her expectations. When by the revival of ancient laws he proceeded firmly in curtailing the powers of the nobility they endeavored unsuccessfully to depose him. Bona, universally hated, finally quitted Poland with immense treasures for Italy, where she was poisoned by her paramour in 1557. Under Sigismund the Reformation made great progress in Poland, and many senators, landed proprietors, bishops and clergy exchanged the Roman Catholic faith for Protestantism. In 1563 Sigismund gave toleration to the different religious parties, and in 1572, at the Diet of Warsaw, proclaimed universal religious freedom. With his death the Jagellon race became extinct. See Poland.

SIGISMUND III, or **SIGISMUND VASA,** king of Poland and Sweden: b. 1566; d. Warsaw, 1632. He was the only son of John III, king of Sweden, and of the Polish princess Catharina, a sister of Augustus Sigismund II. After the death of Stephen Bathori he was invited, in 1587, to become king of Poland, and having sworn the Pacta Conventa was crowned at Cracow. He was a very zealous Catholic, and his principal aim was the extension of the Roman Catholic faith in Poland. On the death of his father, John III, in 1592, he set out for Sweden to take possession of the throne to which he had succeeded, and was crowned in 1594. On his return to Poland he was obliged to leave Sweden under the regency of his uncle who ultimately reigned over it as Charles IX. Sigismund's refusal to give up the Swedish crown, of which he became deprived, involved Poland in a disastrous war with Sweden, which lasted for 60 years. Consult Niemojewski, S., 'Mémoires' (Lemberg 1899); Niemcewicz, J. U., 'History of the Reign of Sigismund III' (Breslau 1836); 'Sveriges Historia' (Vol. III, Stockholm 1881); Rembowski, A., 'The Insurrection of Zebrzydowski' (Cracow 1893).

SIGL, zē'gl, **Georg,** mechanical inventor: b. Breitenfürth, Lower Austria, 1811; d. Vienna, 9 May 1887. He was in youth apprenticed to a locksmith and practised his trade in Bavaria, Württemberg and Switzerland. In 1832 he took employment in the rapid printing press factory of Helwig and Müller, and in 1837 introduced the manufacture of rapid printing presses into the hand press factory of Dingler in Zweibrück, and opened a branch factory of the same sort in Vienna, where he constructed the first rapid lithographic press (1851). Later he manufactured rotary presses, and applied himself to improving the locomotive and other machinery.

SIGMA XI (*Σπουδῶν Ξυνωνες,* "companions in zealous research"), a college honorary society for scientific students, founded at Cornell University in 1886 and now possessing chapters in 30 colleges and schools. It provides for scientific students a society similar to that of Phi Beta Kappa in literature. Its object is to provide meetings for the discussion of the work of its members, promotion of a fraternal feeling among them, the encouragement of original research in pure and applied science and to aid scientific progress by the publication of material dealing with its development and achievements. The membership includes resident professors and instructors, graduates and, in limited numbers, undergraduates who evidence unusual promise. Honorary membership is accorded scientists who have achieved important work in either pure or applied science. The badge or insignia is a gold watch pendant in the form of a monogram of the two letters of the Society. Annual conventions are held, each chapter sending three delegates who meet with the council of the Society. The Society was at first averse to extending its organization, but there are now 30 chapters, of which that at Yale University was established in 1895 and that at Columbia in 1915. The combined membership of the Society is about 10,000, of whom about 2,300 are active members. Since March 1913 the Society has published the *Sigma Xi Quarterly.* Consult Ward, H. B., 'Sigma Xi Quarter Century Record and History, 1886–1911' (1911).

SIGN LANGUAGES are vehicles of communication by gestures, principally employed by primitive peoples, such as the American Indians. They are of two kinds, the descriptive and the characteristic or indicative signs. Descriptive signs involve an account, more or less complete, of the appearance, qualities and uses of an object, or the circumstances of an event, for the purpose of description or explanation; and must, from their nature, be varied, like a painting, only by the point of view from which the objects are described, or the capacity and accuracy of the person that describes. The indicative signs, on the contrary, which are employed in common conversation, are usually mere abbreviations of these, involving a single striking feature of the person, or object, or event; as an elephant is indicated by its trunk, a flower by its fragrance or a town by a collection of roofs. The signs of persons are usually conventional, and derived from some feature, or mark, or habit but often from an accidental circumstance in dress, etc., which struck the deaf-mute on first seeing the person and is still referred to when it no longer exists. This form of expression, as developed in certain institutions for deaf-mutes, is of a character which those who value it least admit to surpass speech in the force with which it communicates the feelings and states of mind. Like painting (as Condillac observes) it has the immense advantage of presenting a group of ideas at once, which lose much of their force and beauty by being detailed in the successive words and artificial arrangements of written language. The eye, the hand, the whole body, speak simultaneously on one subject; the representation changes every moment, and these peculiarities, with the elliptical form of expression which is adopted in conversation, give a rapidity to communication by the sign language which, on common subjects among those familiar with it, surpasses that of speech. If we remark the new shades of meaning given to the same words by the varying attitude and general expression of the speaker, and the accuracy with which a nice observer will discover, in these signs, the thoughts, and feelings, and intentions, even of one who wishes to conceal them, we shall find reason to believe that they are capable of conveying the most delicate shades of thought. Generic and abstract terms, as their objects do not exist in nature, have no corresponding terms of equal clearness in the sign language; and the abbreviated manner in which we express relations by conjunctions, prepositions, relatives and inflections, can only be imitated by adopting similar conventional signs, which do not easily fall in with the idiom of the language. In these respects, therefore, the sign language lacks the algebraic brevity and accuracy which are found in artificial languages, and which render these so invaluable as mediums of thought and instruments of philosophical investigation; at

the same time it is capable of describing what is conveyed by these forms, with an accuracy at least as great as that of words by circumlocution and example. It is worthy of remark that the order of expression in the sign language is that which we term inverted — the subject before the quality, the object before the action and, generally, the thing modified before the modifier. This language, in its elements, is to be found among all nations and has ever been the medium of communication between voyagers and the natives of newly-discovered countries. It is employed by many savage tribes to supply the paucity of expression in their language, or to communicate with other tribes, as has been observed among the Indians of North America. Among the Indians of the western regions of the United States, Major Long found it an organized language employed between tribes who spoke different articulate languages. His account, as well as others given by subsequent inquirers, shows that it corresponds very closely with that adopted in the school of Paris; and a Hawaiian, who visited an American asylum for deaf-mutes, gave a narrative of his life in the sign language, which was perfectly understood by the pupils. As a proof that the sign language does possess a universal character in its cultivated form, a trustworthy authority, who himself acquired it in this form, has asserted that he employed it, or had seen it employed, with success, in communicating with an American Indian, a Hawaiian, a Chinese and the deaf and dumb in various parts of the United States, in England, Scotland, France, Germany, Switzerland and Italy. Consult Clark, W. P., 'The Indian Sign Language' (Washington 1885); Mallery, G., 'Introduction to the Study of Sign Language among the North American Indians' (Washington 1880); id., 'A Collection of Gesture Signs,' etc. (ib.); id., 'Sign Language among North American Indians' (1881); Roth, W E. 'Ethnological Studies . . . Queensland Aborigines' (London 1897).

SIGNAL CORPS. See ARMY AND NAVY MANŒUVRES; UNITED STATES, ARMY OF THE.

SIGNAL SERVICE, The. See METEOROLOGY.

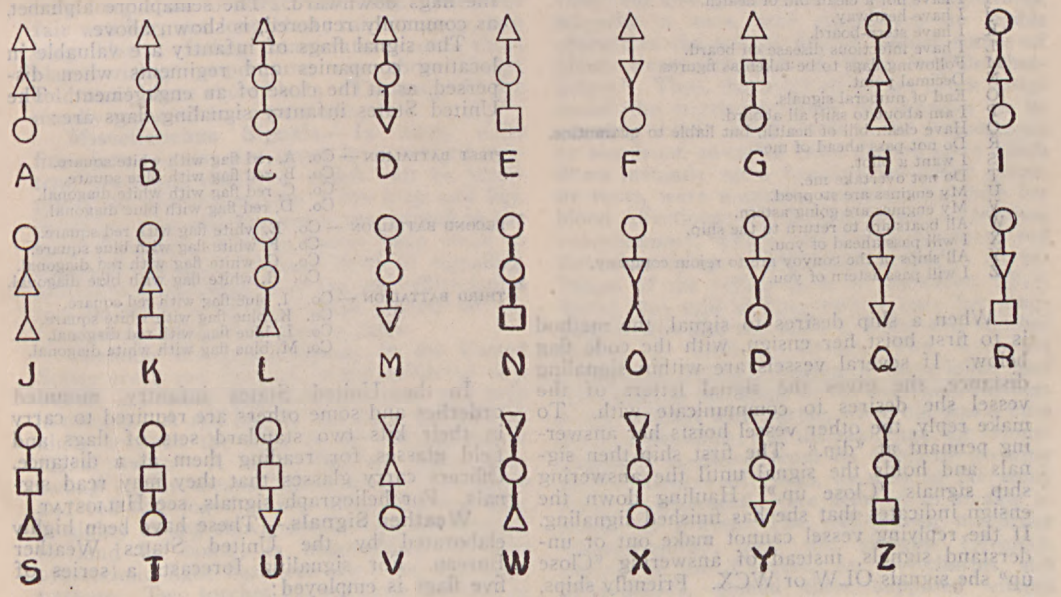
SIGNALS, Naval, the means of transmitting intelligence at sea by the agency of sight or hearing. These means are divided into three classes: day signals, night signals and day and night signals. The first consist of flags or shapes, moving arms or shapes or the waving of them. The day and night signals used in the United States navy are found in the 'General Signal Book' and the 'Fleet Drill Book.' The first comprises about 7,000 words and sentences arranged alphabetically and regularly numbered. Resort is had also to a vocabulary of about 10,000 conversational terms, to which is added an alphabet and a geographical list of about 11,000 places, each letter and word having its appropriate number. The 'Fleet Drill Book' relates to the tactical formations of a fleet or squadron. Every naval vessel having a set of these books, it is only necessary, in order to signal a message from one ship to another, to indicate the volume and the number in that volume corresponding to the required words or sentences. To do this there are nine rectangular flags representing the digits, one to stand for zero or 10 and three triangular pennants called repeaters, wherewith to duplicate numbers. The lowest flag in the hoist represents the units. In addition there are special flags, comet danger signal, annulling flag, quarantine, convoy flags, etc., also the interrogatory answering, preparatory, numeral, geographical and position pennants. Flags of various colors are available as signals only for a distance but little over three miles. Beyond that long-distance signals are used, such as the semaphore, the collapsing drum or the use of cones, balls and squares — in which the shape takes the place of color. The wireless telegraph and wireless telephone have displaced to a great extent the older methods of signaling. Naval signaling according to the international code is mainly effected by flags, either singly or in groups, interpreted in accordance with the international code book. The present system is of gradual growth out of the earlier ones devised by Sir Home Popham (1803), Captain Marryat (1817) and others. The old international code introduced in 1857 was superseded by a new one in 1902. The latter was prepared in consultation with foreign governments and differs from the old mainly in having a complete flag alphabet, and in the substitution of three-flag signals for all the four-flag signals of the 1857 code, except in the names of places and of ships. See SIGNALS AND SIGNALING for a fuller description of the international code and illustrations of its symbols, etc.

Night signals are made by means of lights, rockets or torches. The waving of a lamp or torch approximates the wig wag and semaphore systems. Night signals are also made according to the system of Lieut. E. W. Very, United States navy, by which fire-balls or stars are shot to a height of about 400 feet. Only two colors are used, red and green, with which any desired signal may be made, a rocket being used to indicate a ship's number and as a signal of execution. Very lights are visible at a distance of 10 miles or more according to the state of the atmosphere. Ardois lamps are much used in the navies of the world — as used by the United States they consist of four pairs of lamps suspended along a cable exending to a masthead. The telegraph code is used, reading the lights from top downward, the red and white lights corresponding to the dot and dash of the telegraph or the one, two of the wigwag system. The lights are now operated by a key-board and a message may be transmitted quite rapidly. White lights are also flashed, long and short flashes indicating the dashes and dots respectively of the telegraphic system. The search light may be used for signaling a ship below the horizon, by reflecting the light on a cloud. Signals have been exchanged in this manner between two ships 60 miles apart. Day and night signals are those transmitted by sound or by wireless telegraph. By long and short blasts of a whistle or double and single strokes of a bell a telegraphic system is possible but only for limited distances. Fog-signals are made by firing guns, blowing horns, the steam-whistle and by sounding the ship's bell. Signals of distress are variously made, by hoisting the national colors upside down, by rocket, by blue lights, etc., or by the wireless telegraph. A famous instance of the use of the last-named method was the wireless call of the sinking *Titanic* which sent the *Carpathia* speeding to the rescue over the intervening miles of water in time to pick up the survivors of that ill-starred vessel. Consult 'International Code of Signals' (issued by the United States Hydrographic Office, Washington 1914) and 'Instructions for Signaling, United States Navy' (ib.).

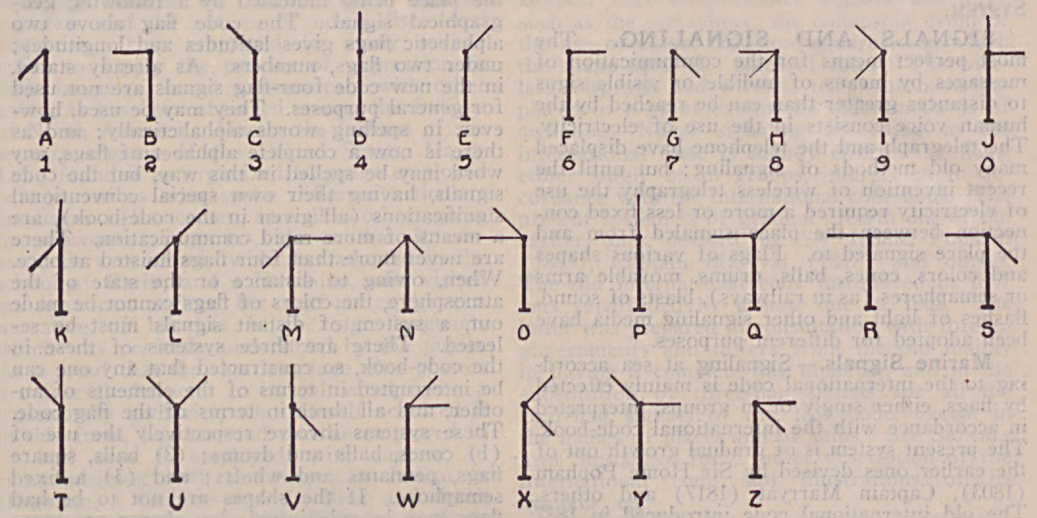
SIGNALS, Railway. See BLOCK SIGNAL SYSTEM.

SIGNALS AND SIGNALING. The most perfect means for the communication of messages by means of audible or visible signs to distances greater than can be reached by the human voice consists in the use of electricity. The telegraph and the telephone have displaced many old methods of signaling; but until the recent invention of wireless telegraphy the use of electricity required a more or less fixed connection between the place signaled from and the place signaled to. Flags of various shapes and colors, cones, balls, drums, movable arms or semaphores (as in railways), blasts of sound, flashes of light and other signaling media have been adopted for different purposes.

Marine Signals. — Signaling at sea according to the international code is mainly effected by flags, either singly or in groups, interpreted in accordance with the international code-book. The present system is of gradual growth out of the earlier ones devised by Sir Home Popham (1803), Captain Marryat (1817) and others. The old international code introduced in 1857 was superseded by a new one in 1902. The latter was prepared by a committee appointed by the Board of Trade and took its final shape after foreign governments had been consulted. The new code differs from the old one mainly in having a complete flag alphabet and in the substitution of three-flag signals for all the four-flag signals of the 1857 code, except in the names of places and of ships. The 27 flags used in the code comprise the «code flag,» or «answering pennant,» hoisted before a code signal is given and as a sign that a signal has been understood; five pennants, denoting the letters C — G; two burgees, denoting A and B; and 19 square flags, representing the other letters of the alphabet. The number of three-flag combinations possible with the alphabetic flags is 15,600, thus affording scope for an immense variety of signals of all degrees of importance. PCJ, for instance, means, «You will find great difficulty in getting through the ice at ——,» the place being indicated by a following geographical signal. The code flag above two alphabetic flags gives latitudes and longitudes; under two flags, numbers. As already stated, in the new code four-flag signals are not used for general purposes. They may be used, however, in spelling words alphabetically; and as there is now a complete alphabet of flags, any word may be spelled in this way, but the code signals, having their own special conventional significations (all given in the code-book), are a means of more rapid communication. There are never more than four flags hoisted at once. When, owing to distance or the state of the atmosphere, the colors of flags cannot be made out, a system of distant signals must be selected. There are three systems of these in the code-book, so constructed that any one can be interrupted in terms of the elements of another, and all three in terms of the flag code. These systems involve respectively the use of (1) cones, balls and drums; (2) balls, square flags, pennants and whefts; and (3) a fixed semaphore. If the shapes are not to be had flags may be substituted; but shapes are more easily read than flags, because the latter flutter. A square flag is equivalent to a cone pointing upward, a pennant to a cone pointing downward and a wheft (or tied flag) to a drum. The code signals in all these systems denote things or meanings rather than words, and thus they can be interpreted by ships of all nations. The international code of signaling by cones, balls and drums, involves the use of the following alphabet:



In the most simple form of two-flag signaling, the code flag is hung up at the masthead or wherever it can be most easily seen, and single flags representing the alphabet are hung successively below. These flags do not bear a letter, but a design, which is more easily recognized at a distance than a letter. Each of the letter flags may be used to represent numerals, A to K standing for 1 to 11, L to S for 22, 33, 34, etc., to 99; T is 100, U is 0, V is 00, W is 000, etc. The letter flags also each stand for a simple message, as follows:



A I am on full speed trial.
B I am taking in (or discharging) explosives.
C Yes.
D No.
E Following flags to be taken as a spelled word.
F End of word, or pause.
G End of spelled words.
H Stop, or come nearer; something important.
I I have not a clean bill of health.
J I have headway.
K I have stern-board.
L I have infectious disease on board.
M Following flags to be taken as figures.
N Decimal point.
O End of numeral signals.
P I am about to sail; all aboard.
Q Have clean bill of health, but liable to quarantine.
R Do not pass ahead of me.
S I want a pilot.
T Do not overtake me.
U My engines are stopped.
V My engines are going astern.
W All boats are to return to the ship.
X I will pass ahead of you.
Y All ships of the convoy are to rejoin company.
Z I will pass astern of you.

When a ship desires to signal, the method is to first hoist her ensign, with the code flag below. If several vessels are within signaling distance, she gives the signal letters of the vessel she desires to communicate with. To make reply, the other vessel hoists her answering pennant at "dip." The first ship then signals and holds the signal until the answering ship signals "Close up." Hauling down the ensign indicates that she has finished signaling. If the replying vessel cannot make out or understand signals, instead of answering "Close up" she signals OLW or WCX. Friendly ships, in passing each other or a signal station, commonly signal their name, where from and where bound, number of days out and longitude of their chronometer. Naval vessels, of course, have their private codes, which are carefully guarded during war-time, that their signals may not be understood by the enemy. All officers are supposed to have glasses convenient for reading signals, when on active duty. Towing signals are made with a flag in the hand at the gunwale. The distress signals begin with N, as NA, Aground; NB, Cannot save ship — take people off; NM, Am on fire, etc.

Army and Land Signaling.— For mechanical signaling the semaphore alphabet is still chiefly used. It can be rendered from signal stations by fixed semaphores or it can be worked in the field by a man with a flag in each hand. In such case the signal for starting is to cross the flags downward. The semaphore alphabet, as commonly rendered, is shown above.

The signal flags of infantry are valuable in locating companies and regiments when dispersed, as at the close of an engagement. The United States infantry signaling flags are:

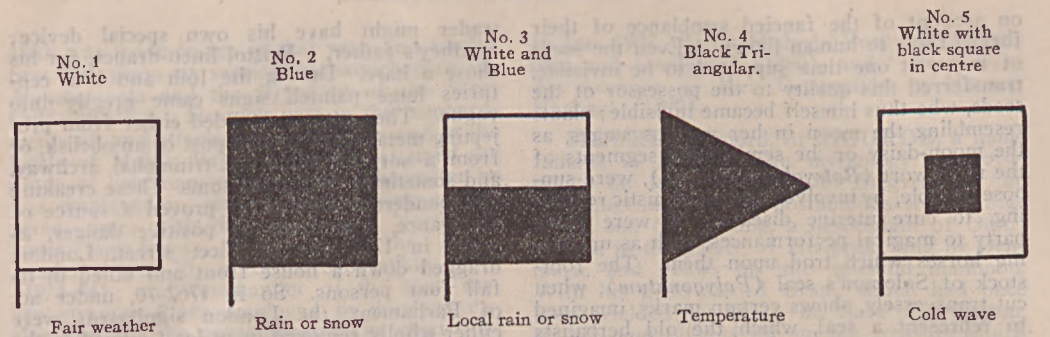
FIRST BATTALION — Co. A, red flag with white square.
Co. B, red flag with blue square.
Co. C, red flag with white diagonal.
Co. D, red flag with blue diagonal.

SECOND BATTALION — Co. E, white flag with red square.
Co. F, white flag with blue square.
Co. G, white flag with red diagonal.
Co. H, white flag with blue diagonal.

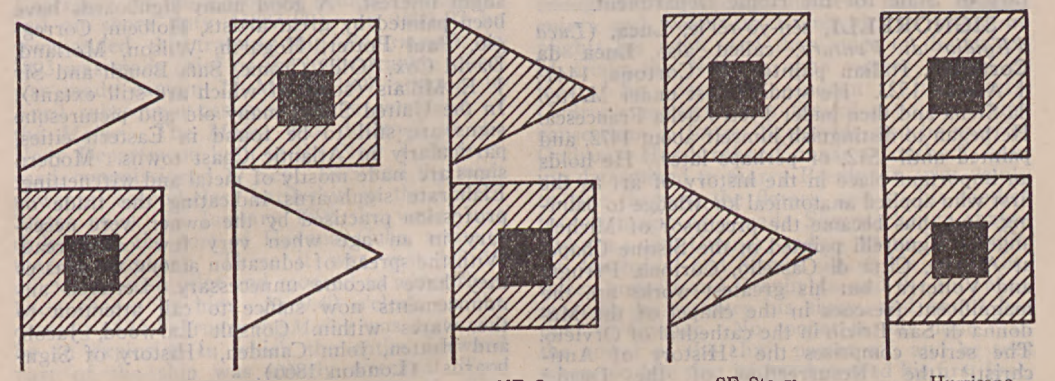
THIRD BATTALION — Co. I, blue flag with red square.
Co. K, blue flag with white square.
Co. L, blue flag with red diagonal.
Co. M, blue flag with white diagonal.

In the United States infantry, mounted orderlies and some others are required to carry in their kits two standard sets of flags and field glasses for reading them at a distance. Officers carry glasses that they may read signals. For heliograph signals, see HELIOSTAT.

Weather Signals.— These have been highly elaborated by the United States Weather Bureau. For signaling forecasts a series of five flags is employed:



The triangular temperature flag is placed above one of the others to indicate warmer, and below for colder weather. For storm signals red flags are employed; if there is a black centre a severe storm may be expected. The direction from which the storm may come is indicated by triangular pennants as follows: (Shading indicates red).



Whistle blasts as weather signals are used in many localities. There is sounded first a very long blast to attract attention. Then for fair weather, one long blast; rain or snow, two long blasts; falling temperature, one short blast; rising temperature, two short blasts; cold wave, three short blasts. These signals are usually repeated for exactitude.

Miscellaneous Signals.— In many cities fire alarm signals are given by a whistle system, sounding numbers, which can be interpreted by any one having a fire map and key. Such fire map and key are often printed in the local directory. Electric lamps have come to supersede lanterns in many fields of signaling. Different arrangements of red and white lamps can be made to give a great variety of information, when used with a code.

Common life-saving signals in the United States are a red light or rocket exhibited to a wreck, indicating that they are seen and help is coming. A red flag by day or a red light at night between the men in the service means "Haul away." A white flag or white light swung slowly means "Slack away." A white and red flag together (or white and red light at night) swung slowly means "Do not attempt to land by boats; is impossible." A blue pyrotechnic light has been used for the same purpose. Two torches burned close together at night are equivalent to beckoning in the daylight, meaning, "This is the best place to land." See LIFE-SAVING SERVICE, THE UNITED STATES. For Railway Signals, see BLOCK SIGNAL SYSTEM; SEMAPHORE.

SIGNATURES, Doctrine of, a mediæval theory of medicine, which was carried into practice by those who believed that "God . . . maketh . . . herbs for the use of men, and hath not only stamped upon them a distinct form, but also given them particular signatures, whereby a man may read even in legible characters the use of them." Many names of plants were derived from these "legible characters." Thus, the color of plants often designated the particular kind of diseases to be cured by them. Such plants as the *Sanguinaria*, or bloodroot, so-called from the red juice which flows instantly upon bruising its fleshy stems, or roots, were naturally considered a cure for blood affections; and the herb-robert (*Geranium robertianum*), which assumes a beautiful red tint when dying, would stanch wounds. An infusion of the yellow bark of barberries (*Berberis*) was said to have been a cure for jaundice, as was also the saffron. Form was another index of medical virtues. The liverwort (*Hepatica triloba*), having a three-lobed leaf somewhat in the shape of the liver, and, furthermore, mottled with purple, when old was a cure for liver troubles; and the saxifrage, the "stone-breaker," so-called from its habit of growing in the fissures of rocks, as well as the stony seeds of gromwell, were believed to be able to break up gravel. The well-known mandrake (*Mandragora*), and the ginseng (*Aralia*), valued by the Chinese, as love-charms and aphrodisiacs, gained their supposed virtues

on account of the fancied semblance of their forked roots to human figures. Even the seeds of ferns, at one time supposed to be invisible, transferred this quality to the possessor of the seeds, who thus himself became invisible; plants resembling the moon in her various stages, as the moon-daisy or the semi-lunate segments of the moonwort (*Botrychium lunaria*), were supposedly able, by involved and alchemistic reasoning, to cure uterine diseases, or were made party to magical performances, such as unshoeing horses which trod upon them. The rootstock of Solomon's seal (*Polygonatum*), when cut transversely, shows certain marks, imagined to represent a seal, which the old herbalists thought pointed to its employment as a styptic for wounds, and they told how the crushed rootstock would shortly take away bruises caused by "women's wilfulness in stumbling upon their hasty husbands' fists."

SIGNET, in England, one of the royal seals, used in sealing private letters and all such grants as pass the sovereign's hand by bill signed. It is always in the custody of the Secretary of State for the Home Department.

SIGNORELLI, sēn-yō-rĕl'lē, **Luca,** (*Luca d'Egidio di Ventura,* called also **Luca da Cortona),** Italian painter: b. Cortona, 1441; d. Arezzo, 1523. He studied first under Matteo da Siena and then under Pietro della Francesca. He began to distinguish himself about 1472, and painted until 1512, or perhaps later. He holds an important place in the history of art as the first who applied anatomical knowledge to painting, and thus became the precursor of Michelangelo. Signorelli painted in the Sistine Chapel at Arezzo, Città di Castello, Cortona, Perugia and Volterra; but his greatest works are the magnificent frescoes in the chapel of the Madonna di San Brizio in the cathedral of Orvieto. The series comprises the 'History of Antichrist,' the 'Resurrection of the Dead,' 'Hell' and 'Paradise.' It was begun by Fra Angelico about 1447, and finished by Signorelli between 1499 and 1504. These frescoes were studied by Canova, and by Michelangelo, who did not disdain to copy some of the figures for his 'Last Judgment.' Among his other works the most worthy of mention are the 'Madonna Enthroned,' the altar-piece of St. Onofrio in the cathedral of Perugia; the 'Adoration of the Magi,' now in the Louvre; the 'Annunciation,' and a 'Madonna,' at Volterra. Signorelli was a man of high character and attained municipal as well as artistic honors. Consult Crutwell, Maude, 'Luca Signorelli' (London 1899); 'Masters in Art' (Vol. VIII, Boston 1907); Dohme, 'Kunst und Künstler' (Eng: trans., 1880); Vasari, Giorgio, 'Lives of the Most Eminent Painters, Sculptors and Architects' (English trans., New York and London 1911).

SIGNS AND SIGNBOARDS. The art of sign painting was known among the Greeks and Romans and specimens of ancient signs have been found at Pompeii and Herculaneum, sometimes painted, but oftener carved. A bush was the sign of many taverns as late as the reign of James I. During the Middle Ages every trade had its emblem, some of which have survived, as the chemist's pestle and mortar, the pawnbroker's three balls and the barber's pole. Besides these trade emblems, every individual trader might have his own special device: Southey's father, a Bristol linen-draper, for his chose a hare. During the 16th and 17th centuries huge painted signs came greatly into vogue. They were suspended either from projecting metal work from a post or an obelisk, or from a sort of miniature triumphal archway, and sometimes cost great sums. These creaking and ponderous signboards proved a source of annoyance, sometimes of positive danger, as when in 1718 one in Fleet street, London, dragged down a house front and killed in its fall four persons. So in 1762–70, under act of Parliament, the London signboards were either wholly removed or at least affixed to the fronts of the houses; and this example was gradually followed throughout the kingdom, though here and there signposts linger or have been restored, even in London. One of the oldest and most interesting signs still existing is the "Red Lion" at Martlesham, Suffolk, England, for it was the figurehead of one of the Dutch fleet defeated off Southwold in 1672; but the history even of vanished signboards has no slight interest. A good many signboards have been painted by great artists, Holbein, Correggio, Paul Potter, Hogarth, Wilson, Morland, David Cox, "Old" Crome, Sam Bough and Sir J. E. Millais (some of which are still extant). In the United States many old and picturesque signs are still to be found in Eastern cities, particularly in Atlantic Coast towns. Modern signs are made mostly of metal and wirenetting. Elaborate signboards indicating the trade or profession practised by the owner were necessary in an age when very few could read. With the spread of education among the masses they have become unnecessary. Lettered announcements now suffice to call attention to the wares within. Consult Larwood, Jacob, and Hotten, John Camden, 'History of Signboards' (London 1866).

SIGOURNEY, sĭg'ẽr-nĭ, **Lydia Huntley,** American author: b. Norwich, Conn., 1 Sept. 1791; d. Hartford, Conn., 10 June 1865. She received a good education, showed considerable facility in rhyme at an early age and many of her pieces were published in the periodicals of the day. For some time before her marriage to Charles Sigourney, in 1819, she had been engaged in teaching in schools for young ladies. In 1815 she published 'Moral Pieces in Prose and Verse,' which was quickly followed by other works, most of which enjoyed great popularity. Among her principal poems are 'Traits of the Aborigines of America' (1822); 'Pocahontas' (1841); 'Scenes in my Native Land' (1844); 'Voice of Flowers' (1845). Her prose works are mainly biographical, historical, didactic and epistolary. In 1840 she visited Europe, and in 1842 gave some reminiscences of the tour in a volume entitled 'Pleasant Memories of Pleasant Lands.' She has been called the 'American Hemans,' and certainly rivals her English prototype in copiousness, having, by her own computation, written 46 works (in whole or in part), and more than 2,000 contributions to about 300 periodicals. Consult the autobiographic 'Letters of Life' (1866).

SIGSBEE, Charles Dwight, American naval officer: b. Albany, N. Y., 16 Jan. 1845; d. 19 July 1923. Appointed to the United States Naval Academy in 1859; was graduated in

1863, was made ensign in that year and for his first two years of service was attached to the *Monongahela* and the *Brooklyn* of the West Gulf squadron. He took part in the bombardments of, and attack on, Fort Fisher, and in the battle of Mobile Bay. In 1868 he attained the grade of lieutenant-commander. Thereafter he was employed in various duties, being at different times with the Asiatic and North Atlantic squadrons; stationed at the Naval Academy 1869–70; in the hydrographic office (1873–74); and commander of the coast-survey steamer *Blake* employed in deep-sea exploration for the government. The chief portion of the outfit of the *Blake* consisted of inventions or adaptations by Sigsbee, and in recognition of these he received a gold medal at the London International Fisheries Exhibition and the decoration of the Red Eagle of Prussia from Emperor William I. Promoted commander in 1882, he was successively on duty at the academy (1882–85); commander of the practice-ship *Dale* (1883–84), and of the *Kearsarge* on the European station (1885–86); and on shore duty (1887–90). In 1890–92 he commanded the training-ship *Portsmouth,* in 1893 was made chief of the hydrographic office, was made captain 21 March 1897 and on 10 April subsequent assigned to the command of the *Maine.* The *Maine* was designed at the Navy Department, built at the New York navy yard, commissioned 17 Sept. 1895 and the most powerful second-class battleship in the United States navy. In January 1898 the vessel was ordered to the port of Havana, Cuba, arriving there 25 January. There it was met by an official Spanish pilot and moored to a mooring-buoy chosen by him. At 9.40 o'clock on the evening of 15 February the *Maine* was destroyed by an explosion in which the entire forward part of the ship was utterly wrecked. Two officers and 264 of the crew perished. The United States court of inquiry appointed to inquire into the catastrophe found that the vessel was destroyed by the explosion of a submarine mine, and that no evidence was obtainable fixing the blame. A Spanish court making a simultaneous investigation reported that the disaster was caused by an internal explosion. It was very generally believed, however, in the United States that the loss of the ship was in some way due to Spanish initiative. Therefore, says Sigsbee in his own narrative, "although the war which followed was not founded on the destruction of the *Maine* as a political cause, that disaster was the pivotal event of the conflict." Sigsbee's wise dispatches at the time did much to suspend any popular demand for immediate reprisals, while his expert knowledge was of great value to the court of inquiry. He rendered distinguished service during the Spanish-American War as commander of the converted liner *Saint Paul,* with which on 24 May 1898 he captured the collier *Restormel,* securing Cervera's coal supply, and 22 June defeated the cruiser *Isabella II* and destroyer *Terror* off San Juan, Porto Rico. Subsequently he was ordered to command the *Texas,* in 1900–02 was chief officer of naval intelligence, in 1903 was made commander of the navy yard at League Island, Pa., and promoted rear-admiral. In 1904–05 he was commander of the South Atlantic squadron, and in 1905–06 of the second division of the North Atlantic fleet. He retired 16 Jan. 1907. He published 'Deep Sea Soundings and Dredging' (1880), and 'The *Maine:* An Account of Her Destruction in Havana Harbor' (1899).

SIGURD, zē'goord, or **SIGURDE,** a name famous in Scandinavian mythology. According to the legend Sigurd, the Siegfried of the Nibelungenlied, is the posthumous son of Sigmund, son of Volsung, a descendant of Odin; is born in the palace of Hialprek, king of Denmark, and grows up into splendid manhood. With his good sword Gram, which had once been wielded by Odin, he slays the dragon, Fafnir, and obtains the golden treasure which it guarded; by eating the monster's heart he is endowed with a wisdom which enables him to understand the songs of the birds. Riding off with his spoil he strikes through a lonely heath, in the midst of which is a volume of flame, surrounding a house in which a fair maiden Brenhyldr (Brunhild in the Nibelungenlied), daughter of Atli, lay asleep, never to be wakened until there came a hero brave enough to ride through the fierce flame. Sigurd enters and wakes up Brenhyldr, to whom he plights his troth, and then rides to the palace of Giuki the Niblung, who wishes Sigurd to marry his daughter Gudrun (Chriemhild). Gudrun's mother gives Sigurd a potion which causes him to forget Brenhyldr, and he marries Gudrun. Her brother Gunnar (Gunther), having determined to marry Brenhyldr, tries vainly to ride through the flames, and so his mother by her magic arts made Sigurd change shapes and arms with Gunnar, and so rescue Brenhyldr. On the bridal bed Sigurd places his sword between himself and Brenhyldr, and the following morning he resumes his shape, and hands her over to Gunnar. No sooner is this done than the power of the elixir passes off, and he sees when too late that he has betrayed his first love. After the lapse of years Brenhyldr is told that she was rescued from the flames by Sigurd and not by Gunnar, as she thought; and her love for the hero gives way to wrath and thoughts of vengeance. She urges Gunnar and his brothers to slay him, but as they had already taken an oath not to hurt him, they refuse. They, however, incite their half-brother to do the deed, and Sigurd is killed as he lay sleeping. The death of the hero revives all the love of Brenhyldr, and lying down by his side with the sword Gram between them, she dies brokenhearted on his funeral pile. Consult Boer, R. C., 'Untersuchungen über den Ursprung und die Enwicklung der Nibelungensage' (Halle 1906); Abeling, T., 'Nibelungenlied' (1907); Lichtenberger, H., 'Le poème et le légende des Nibelungen' (Paris 1891); Paul, H., 'Grundriss der germanischen Philologie' (Vol. III, Strassburg 1900).

SIGURD SLEMBE, slĕm'bĕ', a trilogy by Björnstjerne Björnson, translated by W. M. Payne. This splendid sagadrama, so deeply impressive and so typically characteristic of Björnson, was planned by him already in 1858, when he was manager of the National Theatre in Bergen, but not completed until the author's stay in Rome in 1862. The author made a most thorough preparation for this work. Not only did he digest all that is to be found in the sagas about this unrecognized illegitimate son of Magnus Barefoot, king of Norway, but he

followed his hero in all his travels and adventures around in Europe in the early part of the 12th century. We find the whole spirit of the Middle Ages at the time of the Crusades in the very action, in the psychological exposition, in the tragic solution. *Sigurd Slembe* is the tragedy of the man whose great gifts and talents qualified him for leadership, but of whom his own country would not make use,—a theme which appealed to Björnson especially at the time when the drama was written. The ethical conflict is the same that the author has treated in some of his earlier novels and his saga dramas. According to one of Björnson's letters, it is the conflict, in a man highly gifted by nature, between the craving for self-assertion and the duty to submit one's powers to the demands of a higher and nobler aim. In the first section of the trilogy, 'Sigurd's First Flight,' the hero is presented to us, a powerful, handsome youth, full of energy and ambition. But he has no family name. In the opening scene he forces from his mother the confession of the name of his father. The poor woman at last reveals that King Magnus was her lover. At last he knows from what race he comes. He breaks away to seek adventures, to make a name and to return to claim the throne of Norway.

In 'Sigurd's Second Flight' we find the hero on the coast of the old Norwegian colony Caithness, Scotland, at the court of the exiled Earl Harold of Orkney. This sickly young man has no ambition and asks no more than that to be at rest among his dreams. But his life is tortured by the wranglings of his mother and her violent and intriguing sister. The two women seek the aid of the magnificent Norwegian who has arrived in their palace, nobody knows whence. An orphan niece, Audhild, one of Björnson's finest female creations, falls in love with Sigurd. The young man is eminently successful in his campaign against Orkney. The earl, however, commits suicide and Sigurd rejects the crown which now lies at his hand and passes out to sea again. He tears himself from the arms of Audhild in a scene of extraordinary beauty and passion.

'Sigurd's Return' is the closing play. King Harold Gille, Sigurd's half-brother, is with his court in Bergen. Our hero returns with the same hopes and illusions as when he left. Again, fate is against him. Two of the scenes especially are among the finest ever written by Björnson, the scene between Sigurd and the Finn girl, and Sigurd's sublime soliloquy: "The Danes desert me! The battle is lost! Here and no further!"

Failure confronts him as the result of all his toil. All avenues of escape are closed upon him. As he stands face to face with the ruin of the edifice he so nearly succeeded in erecting, all events of his past life come before him. He sees life in its true aspect. All worldly hopes being broken, Sigurd leans his weary head against the bosom of his aged mother while listening to the song of the Crusaders:

> Fair is the earth,
> Fair is God's heaven,
> Fair is the pilgrim-path of the soul
> Singing we go
> Through the fair realms of earth
> Seeking the way to our heavenly goal.

Johan Svendsen's 'Sigurd Slembe' is a musical illustration of the play. In America only the second section of the trilogy has been performed. It was in Chicago in 1908. The late Richard Mansfield had planned, after his venture with Ibsen's 'Peer Gynt,' to have the entire work condensed for a single evening's presentation and himself play the part of the hero.

GISLE BOTHNE.

SIHOENITE. See FERTILIZERS.

SIKA, sē'ka, the common deer of Japan (*Cervus sika*), representing a group (subgenus *Sika*), whose peculiarity is that the antlers have no bez-tine, so that each has usually only four points; the tail is long proportionately and the ischial white patch is bordered with black. The Japanese deer, abundant in the forests of northern Japan and China, is of small size, dark brown in color and the greater part of the tail white; but in summer the coat is spotted with white. This, and the similar Formosan and Manchurian deer, are often caught in traps and kept as pets by the people; and are capable of thriving in European parks. A closely related form is the Caspian deer (*C. caspicus*) of northern Persia. Consult Lydekker, Richard, 'Deer of All Lands' (London 1898).

SIKESTON, sīks'tŭn, Mo., city in Scott County, 125 miles southeast of Saint Louis, on the Saint Louis and San Francisco and the Saint Louis, Iron Mountain and Southern railroads. It manufactures flour and boxes, and has hoop and heading factories. Pop. 3,227.

SIKHIM, sīk'im, or **SIKKIM,** India, a native state under British protection, situated in the eastern Himalayas between Nepal and Bhutan, and between Tibet and the province of Bengal. Area, 2,818 square miles, and population 87,920. Of these 58,675 are Hindus. Buddhists number 28,915 and there are 285 Christians. It forms part of the south slope of the Himalayas and ranges in altitude from 18,000 feet in the north to 1,000 feet in the south. Its extreme length from north to south is 70 miles and its extreme breadth 50 miles. The climate is accordingly varied, ranging from tropical to alpine. Formerly most of the area was covered with forest, but the greater part below 5,000 feet has in recent years been cleared and cultivated. The chief products are maize and rice, oranges, apples and woolen cloth. A few copper mines are worked. The mountain roads are good, and the route of British trade with central Tibet passes through the state. In 1890 a treaty was signed by the viceroy of India and the Chinese representative, by which the British protectorate over Sikhim was recognized by China. The British government has direct and exclusive control over the internal administration and foreign relations. The Mahárájá, after having declined to comply with the conditions, lived for some time under surveillance in British India, and in 1895 was allowed to return to Sikhim. The Mahárájá and the members of the Council carry on the administration, with the assistance of the British political officer stationed at Gangtok. The inhabitants are Bhutias, Lepchas and Nepalese, the last named being now the most numerous. Principal towns are Gangtok, the capital, Rhenok, Rangpo, Pakyong, Lachen and Lachung. Lamaism is the common form of religion. The gross revenue is about $72,500 annually. Consult Strahan, 'Report on Explorations in Sikhim' (Dehra Dun 1899); Waddell, 'Among the Himalayas'; White, J. Claude, 'Sikhim and Bhutan' (London 1909).

SIKHS, sēks, the name of a religious sect in British India, which has come in course of time to be virtually also the designation of a race or people. Nanak Shah was the founder of the sect, which worships only one omnipotent and invisible God, and whose tenets reflect the broadest religious philanthropy and toleration. Nanak Shah belonged to the Hindu tribe of the Vedis, and was born in 1469 in the village of Talwandi, now the town of Rajapur, in the province of Lahore. Nanak was a profound thinker, and far in advance of the views which prevailed in his day in any part of the world in relation to liberty of conscience and human brotherhood. His impressions in this regard were largely derived from the works of a Mohammedan named Kabik with which he became acquainted in his travels. He sought to introduce simplicity of faith and purity of morals, and to induce Hindus and Mohammedans to live in harmony. He died about 1540, and was buried at Kirtipur, which is, therefore, a place of pilgrimage for the Sikhs. He well deserved the honor in which his memory is held. His life was pure, he absolutely denied any power to perform miracles and he taught his disciples to worship God alone. Although peace between men was an essential part of the Sikh religion, the horrible persecutions to which they were subjected by the Mohammedans forced the Sikhs to become a military people, and under their great leader, Vovind Sinh, they fought so bravely and successfully as to receive the title of Sihns or lions. They wore a blue dress, let their hair grow and were always armed. Govind Sinh also instituted the order of "akalis" or "immortals," in whom to this day rests the supreme direction of religious affairs among the Sikhs. The struggle between Sikhs and Mohammedans and between independent communities of Sikhs continued until Runjeet Singh, the son of Maha-Singh, succeeded in establishing himself as despotic ruler of the Sikhs, about the close of the 18th century, and made himself master of a territory comprehending the whole Punjab and adjoining districts, with an area of 69,000 square miles. After the death of Runjeet Singh, and while his son, Dhulip Singh, a minor, was the nominal ruler, war broke out between the British and the Sikhs, in 1845. The struggle lasted with varying fortune, and intervals of temporary submission on the part of the Sikhs, until the decisive battle of 21 Feb. 1849, when the Sikh power was completely broken, their territory being annexed in the following month to the British Empire in India. The Sikhs have since proven faithful friends of the British, and never wavered from their allegiance at the time of the great Mutiny. They are now among the best of the British Indian troops. The Sabijdari are the leisure class of the Sikhs while the lower class are termed the Kesadhari. Their total number is in excess of 3,000,000. See also INDIA; RELIGIOUS SECTS.

Bibliography.— Field, Dorothy, 'The Religion of the Sikhs' (London 1914); Cunningham, J. D., 'History of the Sikhs' (ib. 1903); Hopkins, E. W., 'Religions of India' (Boston 1895); Macauliffe, M. A., 'The Sikh Religion: Its Gurus, Sacred Writings and Authors' (6 vols., Oxford 1909); Rait, 'Life and Campaigns of Viscount Gough' (London 1903).

SIKINO, sē'kē-nō or sē-ké'nō (ancient, SIKINOS), Greece, an island east of Melos, belonging to the Cyclades. It is 10 miles long by three wide. It has a rugged mountainous surface, but the soil is fertile. Wine is the staple. Its chief town is situated on the brow of a lofty precipice. In ancient times the island belonged to Athens, and in the Middle Ages to the duchy of Naxos. For centuries it was part of the Turkish dominions in Europe, but its Greek population secured its inclusion in the modern kingdom of Greece.

SIKSIKA, sīk'sī-kâ ("Blackfeet," by which name they are popularly and officially known), an important tribe and confederacy of the Algonquian stock of North American Indians, the confederacy comprising the Siksika proper, the Kino or Bloods, and the Piegan. They should not be confounded with the Blackfoot division of the Teton Sioux on Standing Rock Reservation, N. D. The early Siksika home was the country north of Lesser Slave Lake, but in the middle of the 18th century they appear to have lived on the west side of Lake Winnipeg, whence they were forced westward by the Crees; 40 years later the Siksika proper occupied southern Saskatchewan River, while the Piegan lived on its headwaters, after which time the latter, followed by the Siksika, moved down to the Missouri River. Early in the 19th century the home of the Siksika was northern Montana and the adjacent part of British America, extending from the Rockies to the junction of Milk River with the Missouri, and from Musselshell River in Montana to Saskatchewan River in Canada. The component tribes of the confederacy are now gathered on reservations within these limits, the Siksika and the Kino or Bloods being mainly under Canadian rule, while the Piegan, who constitute about half the confederacy, are chiefly in Montana. Both the men and women are tall and well formed; they practised polygamy, and on the death of the husband his wives became the potential wives of his eldest brother, while his property descended to his sons or, if he had none, to his brothers. These Indians were always noted for their warlike character, their hostilities being conducted chiefly against the Cree, Crows, Shoshoni, Kutenai and Flatheads. They relied mainly on the buffalo for subsistence, their food, clothing, shelter and some of their implements and utensils being derived from this useful animal. They lived in skin tepees and besides bags and cases of hide or parflèche, made implements and utensils of stone, bone, horn and wood, but no pottery or basketry. Marriage within the gens was prohibited, but this rule is not now strictly observed. Each gens had its chief, and the chiefs of the gentes chose the tribal chief, but the power of the latter was in the main only advisory. The Siksika are nature worshippers, their principal deity being the sun, whose wife is the moon, and whose surviving child is the morning star, while physical objects and forces are minor deities. In the latter part of the 18th century these tribes were estimated

at 12,000, but they lost about a third of their number by smallpox in 1836, and in 1858 aggregated only about 7,300. The number of Siksika, Bloods and Piegans on reservations in Alberta is now about 3,000, and the population of the Piegans on the Blackfoot Reservation in Montana is less than 2,000. Consult Hodge, F. W., 'The Indians of North America' (Washington, D. C., 1906).

SILAGE, or **ENSILAGE,** green fodder preserved in a succulent state by exclusion of air; where it undergoes certain changes. In the United States Indian corn (*Zea mays*) is preeminently the crop for silage, so when other crops are utilized a designatory adjective is prefixed, as clover-silage, etc. Silage may be stored in silos, or air-tight structures, made of wood, brick, stone or concrete reinforced with iron. Square, octagonal and rectangular silos are in use but the round silo is the most common. Until recently lumber has been the cheapest material but concrete has been steadily gaining in popularity both because of its permanence and its being more air-tight. The cylindrical form is also preferred because it requires the use of less material, contains less waste space and presents the greatest strength, pressure being distributed equally at all points from the centre. When placed in silos, the fodder is usually cut or shredded into short lengths so that it will occupy less space, incorporate less air and undergo less fermentation than when packed uncut. In Europe grass is frequently stacked in the open or put into clamps or pits without cutting it into lengths. The use of the silo in one form or another dates back to antiquity, the clamp being probably the oldest form. About a hundred years ago this method of preserving fodders attracted attention in Europe and in 1875 Dr. Manly Miles of Michigan, and in 1876 F. Morris of Maryland, introduced the system into the United States. Many extravagant claims were advanced in its behalf by early enthusiasts, and lack of knowledge led to numerous failures, so that the progress made was small for some years. In 1882 but 92 farmers could be found who used the silo in the United States. The work of Professors McBryde and King, of the Wisconsin and other agricultural experiment stations, made the position of the silo and silage secure. To-day the livestock and dairy farm is considered incomplete without one.

The size of the silo is important, serious losses occurring from lack of proportion between the size of the silo and the amount of silage fed daily. The exposed surface is usually too great. The upper layer, if exposed, spoils; hence about one and two-tenths inches should be fed each day from the whole surface and two inches would be better. A cow will consume 35 to 40 pounds a day, so if a cubic foot weighs 40 pounds, we may allow five to six square feet by two inches thick for each cow a day. Silos less than six feet in diameter are not considered to be practical on account of the friction of the walls preventing the contents from settling properly, because the greater surface in proportion to bulk means greater percentage of loss. Deep silos are preferable to shallow ones, as a 36-foot silo will store nearly five times the amount that a 12-foot one will, the diameters being equal. King calculates that the average weight of a cubic foot of silage from a silo 10 feet deep is 18.7 pounds, while the average from one 36 feet deep is 42.8 pounds. All silos should be at least 20 feet deep and 30 feet is better. The pressure of the silage when settling increases with the depth at the rate of 11 pounds a square foot for each foot of depth, hence, at 10 feet down the lateral pressure is about 110 pounds a square foot; at 20 feet, 220 pounds, and at 30 feet, 330 pounds; therefore, the hoops of a wooden silo and the iron bands in a concrete one should be larger, stronger and closer at the bottom of the silo than at the top, the first one starting six inches from the bottom, the second a foot above the first, increasing the space six inches with each hoop, until near the top they are finally four feet apart.

The crops used for silage include corn, millet, common red and alsike clover, rye, vetch, oats, pea-vine, sorghum, kaffir corn and alfalfa. The making of silage from several of these crops has scarcely passed the experimental stage. This is not so much because they cannot be preserved as because corn has proved so unsatisfactory. The low cost and ease with which heavy crops of corn can be produced; the slight losses sustained in the silo (2 to 10 per cent), and the few objectionable features that corn silage has, render it the general purpose crop. The percentage of losses which occurs in drying corn fodder in the field under good conditions is about the same as that attending its loss when converted into silage. The cost of growing and placing a ton of silage in the silo generally varies between $1.75 and $2.50. The Southern dent varieties produce the heaviest crops, and, if they mature sufficiently in the district, are generally grown. The best time to cut corn for silage is when the kernels are "in the milk" stage of maturity but the stalks, leaves and husks green, as under these conditions less fermentation and other losses occur. Millet has been tried to a small extent. Clover makes good silage, but the unavoidable losses are higher than with corn. This crop should be cut when the bloom has begun to turn brown. Rye and oats, owing to their hollow stems which carry considerable air, are subject to serious loss in weight when made into silage. Pea-vine silage is a by-product of canning factories. Alfalfa silage is still in the experimental stage. Grass is used for silage in the United Kingdom.

THE AVERAGE PERCENTAGE COMPOSITION OF CORN SILAGE.*

	Per cen
Moisture	7.11
Ash	4.76
Nitrogen	1.204
Albumenoid nitrogen	.65
Albumenoids (alb. N. × 6.25)	4.062
Non-Albuminoids (non-alb. N. × 6.25)	3.463
Crude fibre	24.36
Reducing sugars	.0132
Starch	28.00
Other carbohydrates and acids (by difference)	25.6718
Ether extract	2.66

When corn is nearly mature before being siloed it will be more palatable and probably more digestible than if cut while younger or when fully ripe. The digestibility of corn silage and dry fodder corn are about the same, both being somewhat less digestible than green fodder.

*Larson and Putney.

Silage is pre-eminently a food for the cow, so its use will largely remain with the dairy farmer. Feeding trials with dairy cows show that silage usually gives better results than a corresponding amount of dry fodder. It has been ascertained that the use of silage produces from 4 to 5 per cent more milk and fat per 100 pounds of dry matter feed, due to the silage being more acceptable, and the stalks of corn being cut up in the silage and eaten, instead of rejected as when fed in the form of corn fodder. In feeding great care must be exercised not to leave unconsumed and putrifying silage about the stables as the odor may taint the milk. Several milk-condensing factories formerly refused the milk from silage-fed cows, but proper rules for feeding and also inspection have removed the objections of the condensors. Experts may detect a silage odor or flavor in milk from silage-fed cows, but this is of little import, as such milk, and butter made from it, are now sold to critical customers in cities at high prices. When used for fattening cattle, silage produces a more watery carcass than dry fodder. It is a good feed for sheep, being especially useful for ewes with lambs at foot. It is not adapted to pig feeding nor to work horses, but small amounts may be fed to idle horses. Consult King, 'Physics of Agriculture' (Madison, Wis., 1899); Larson and Putney, 'Dairy Cattle Feeding and Management' (New York 1917).

SILAO, sē-lä'ō, Mexico, a town in the state of Guanajuato, situated on the Mexican Central Railroad, 15 miles southwest of Guanajuato. It is the centre of a rich agricultural district, and manufactures cotton and woolen goods. Pop. 14,059.

SILAS MARNER, a brief novel written by George Eliot (MARY ANN EVANS) in 1861, has always been one of the most popular as it is among the greatest of its author's works. The scene of the story is laid in the typical English village of Ravelow, at a time "when the spinning wheels hummed busily in the farmhouses." Against a picturesque and realistic background of rural life and custom George Eliot has set the strange and alien figure of the weaver, Silas Marner, who has come hither as an outcast from a narrow religious community in the city, where he has been unjustly convicted of robbery. Utterly broken in spirit, bankrupt of his simple faith, and cut off from all kindly human interests he becomes a miser, cherishing the ever-growing heap of his earnings at the loom as the sole object of his starved affections. When his gold is stolen by the vicious Dunstan Cass, younger son of the village squire, his life is left utterly barren and he becomes practically insane. At this crisis the abandoned wife of Godfrey Cass, Dunstan's elder brother, perishes in the snow before Marner's hut, and his child, Eppie, is found by Marner and welcomed as a providential gift sent to replace his stolen gold. The theme of the novel is the transformation in Marner's life, the restoration to his simple and affectionate soul which comes with this substitution of a human love, demanding care and sacrifice for the miser's perverted love of gold. Interwoven with the story of Silas is that of Godfrey Cass, the good-hearted, but weak and badly brought up father of Eppie, who pays for his unwillingness to accept the consequences of his unworthy marriage, by seeing Eppie, now grown to womanhood, adhere to her foster-father even when Godfrey and his second wife, Nancy, at last tell her the truth about her parentage and would gladly welcome her to their childless home. The story is as beautiful as it is significant. The variety of the characterization, the consummate handling of the narrative, and the profound moral insight of the author make this novel an unquestioned masterpiece in English fiction.

JAMES H. HANFORD.

SILAY, sē-lī', Philippines, pueblo or town of Negros Occidental, on Guimarás Strait, 10 miles north of Bacólod. It is a large and prosperous town open to coasting trade, and is a telegraph and military station. Pop. 15,649.

SILCHESTER, sil'chĕs-tẽr, England, a village in Hampshire, seven miles north of Basingstoke, of special archæological interest. Here are the ruins of Caer Segeint, or Calleva Atrebatum, a Roman town, the main features of which are an amphitheatre, and the city walls, 2,760 yards long. The foundations of a basilica, forum, baths and a temple have also been excavated, and rings, coins, seals, broken pottery in abundance have been found near the surface. Antiquarians have given the place much study. Excavations were begun by Joyce in 1864 but it was not until 1890, when the Society of Antiquaries took up the work, that the excavations were systematically carried out. By 1910 nearly all the ancient town had been uncovered, disclosing very many interesting remains. All portable objects now repose in the Reading Museum. Consult Haverfield, F., 'The Romanization of Roman Britain' (3d ed., Oxford 1915) and *Archæologia* (Vols XL, XLVI, LII et seq.), containing plans, illustrations, etc.

SILENACEÆ, a family of plants, of which the pink, named by botanists in early times *Caryophyllus,* and more recently *Dianthus,* may be considered as typical. The plants of this family are readily distinguished by their opposite undivided leaves, without stipules, the tumid articulations of the stems and the disposal of the seeds upon a free central placenta, surrounded by several carpellary leaves. Several species are cultivated by florists; a few are used in medicine, and *Saponaria officinalis* and *Lychnis diurna* yield a mucilage resembling soap. The Clove-pink (*Dianthus caryophyllus*) is the origin of all the cultivated varieties of carnations, picotees, bizarres, flakes, etc.

SILENE, a large widely distributed genus of the pink family (*Caryophyllaceæ*), having opposite leaves, and five-merous flowers, with a more or less inflated calyx. The silenes are either annual or perennial and of varying habit and inflorescence. Many species are viscid pubescent as *Silene virginica, S. caroliniana,* and *S. viscosa,* the last the catchfly, which is carnivorous to a slight degree and holds its victims by its stickiness. In general, however, the viscid stems prevent crawling insects, such as ants, from stealing honey and both common and generic names refer to this characteristic. *Silene nutans* and *S. noctiflora* are now naturalized in America and are faded and unattract-

ive in the daytime, but are in full bloom, with starry white petals at night, attracting night-flying insects by their fragrance. Another naturalized silene, found at the borders of fields, is the *S. vulgaris,* a glaucous tall plant, known as bladder campion, cowbells, behen, and spattling or frothy poppy. The first two names refer to the inflated calyx, which is much more conspicuous than the white notched petals protruding from the top, and in fruit is nearly globose, nodding in cymose panicles. It is of papery texture, tinted pale green flushed with rose and is reticulated with delicate veinings. It is said that English peasants have eaten its young shoots, tasting like green peas, instead of asparagus. The moss-campion (*S. acaulis*), a tufted perennial covered with reddish purple flowers, is common to Arctic regions and mountains; the sweet-william catchfly (*S. armeria*), with rose-colored flowers; and the fire pink (*S. virginica*), whose crimson flowers blaze in southern dry woods, are all cultivated, to which the northern wild pink (*S. caroliniana*) might well be added, as it has many rose-colored or white flowers in very early spring.

SILENT CHAIN, an improved form of link-belting consisting of a broad band of metal links the ends of which project inward of the belt circuit forming cog-shaped teeth which engage in a broad-faced toothed gear wheel. This chain belt has the advantage of working perfectly where the pulley shafts are necessarily close together, and are especially adaptable in the transmissions in automobile machinery. They have the additional advantage of being practically noisless. See POWER TRANSMISSION.

SILENT PARTNER, called at various times and places a dormant, sleeping or special partner. In commercial phraseology a member of a firm or corporation whose name does not appear publicly in the concern, but who shares the responsibilities and liabilities of the organization. Generally a partner of this sort takes no active part in the management of the business, outside of giving monetary support or receiving his portion of the profits. See PARTNERSHIP.

SILENUS, sī-lēn'nŭs, represented in ancient mythology as the mentor and companion of Bacchus, the god of wine. Silenus, according to the legend, was generally drunk himself. He is sometimes represented as treading out grapes and other times as riding on an ass with the infant Bacchus in his arms. Various legends about him were current in antiquity especially in Asia Minor, where his worship first took concrete form. Consult 'Dictionary of Greek and Roman Mythology'; and 'Gruppe, Otto, 'Grieschische Mythologie und Religionsgeschichte' (2 vols., Munich 1906).

SILESIA, sī-lē'shī-a (German SCHLESIEN), a former Bohemian duchy, later divided between Prussia and Austria, and under the Peace Treaty of 1919, with a section assigned to Czecho-Slovakia and another for plebiscite.

Prussian Silesia is a province in the southeast of the state, length 230 miles, breadth 80 miles; area 15,569 square miles. The region is traversed lengthwise by the great longitudinal valley of the Oder. That river flows from southeast to northwest, and with its numerous right and left branches drains practically the whole of its area. To the west of this great valley the surface is taken up by the eastern slope of the Sudetic Mountains with its numerous spurs and minor ranges. East of the Oder the land rises in several more or less isolated and hilly, but not high, plateaus. Nearly nine-tenths of the forests are coniferous. The region is rich in mineral resources. Its coal deposits are among the richest in Europe. Iron and zinc are mined in large quantities and lead and silver are also found. An average annual production of coal in normal years is 40,000,000 metric tons; of zinc, 600,000 metric tons, while of iron and lead considerably less quantities are produced. The climate in the lowlands is favorable for agriculture and the valley of the Oder is very fertile and one of the richest wheat and barley regions in the empire. Oats, rye, buckwheat, potatoes and fruit are also raised in large quantities and there is some viticulture. The textile industry is the most important, next to which follow the metal industries and others depending on mining and quarrying, such as the manufacture of cement, porcelain and glass. Lumbering and the manufacture of paper, beet-sugar, starch and liquors are also important. About 1,600,000 people depend on agriculture for a livelihood, while 1,750,000 are engaged in industrial occupations. Besides the main Oder there are scarcely any navigable waterways. There are about 2,500 miles of railroad. Pop. about 5,225,962. The capital is Breslau (515,000) which is the principal industrial centre. Silesia sent 35 members to the Reichstag and 65 to the Landtag. Other populous centres are Görlitz (85,000), Königshütte (72,000) and Beuthen and Liegnitz (each 67,000). Of the population 2,960,800 are Roman Catholics, 2,199,000 Protestants and 45,000 Jews.

Former Austrian Silesia was a crownland and duchy situated between the southern part of Prussian Silesia and Moravia and bounded on the southeast by Galicia and Hungary. It measures 115 miles from northwest to southeast, with a breadth of 20 miles and an area of 1,987 square miles. The northwestern part belongs to the Sudetic Mountains, the southeastern to the Carpathians, and in the middle is the transverse valley of the Oder. The chief mineral products are coal and iron, the coal amounting to about 7,500,000 tons annually. Agriculture is confined to the central lowlands and yields grain, sugar-beets and fruit. The industries are more important; there are machine shops, steam textile mills, beet-sugar factories, distilleries, etc. There is a considerable transit trade in Austrian wines, salt and also in beef. Pop. 756,949. Of these 639,000 are Roman Catholics and 102,000 Protestants. German is spoken by 48 per cent of the people, Polish by 33 per cent and Czech by 29 per cent. Troppau, the capital, has 31,000 inhabitants. Other cities are Ostrau (22.000), Teschen (22,000) and Bieletz (18,000).

In the 10th century Silesia was incorporated with Poland. In the latter part of the 12th century it was made a separate duchy. In the 13th century the duchy was divided into numerous principalities. By the middle of the 14th century these had become actual vassals of the Bohemian king, and in 1526 they passed to the house of Hapsburg. In 1675 Frederick William, of Brandenburg, laid claim to Silesia. The emperor refused to recognize the claim and

the three Silesian wars followed, which ended in 1763 with the supremacy of Prussia over what later became Prussian Silesia. During the European War, Austrian Silesia was invaded by the Russian armies. Under the Peace Treaty of 1919, the Czech section of Silesia (area, 1,988 square miles; pop. 756,949) was assigned to the Czecho-Slovak Republic while Upper Silesia was reserved for a plebiscite. In March 1921 a plebiscite was held in Upper Silesia which resulted in a majority for remaining in Germany. The Poles within the area rebelled and civil strife ensued for several months, France conniving with the Polish insurgents and Great Britain leaning to the German side. The warring factions were at last persuaded to suspend hostilities and the question was referred to the Allied Supreme Council. It met in Paris 8–12 Aug. 1921 and, failing to agree, referred the question to the Executive Council of the League of Nations. The decision of the latter, made public 20 Oct. 1921, divided the plebiscite area in almost equal parts between Poland and Germany and set up administrative machinery for a new regime to cover a period of 15 years. The dividing line follows the Oder from Odenburg to Niebetschau, thence northeasterly to Hohenlinde; thence between Rossburg and Birkenheim, it turns northwestward to Lissau. Northwest of the latter place it follows the old German frontier to the latter's junction with the new German-Polish frontier. This line leaves 42 communes to Germany and cedes 40 to Poland.

A mixed Upper Silesian Commission, composed equally of Poles, Germans and Upper Silesians, was set up to facilitate administration.

SILHOUETTE, sĭl-oo-ĕt', is the representation in solid black of the outlines of an object, occasionally with a few assisting lines drawn in white. The name comes from Etienne de Silhouette, French Minister of Finance in 1759. He strove by severe economy to remedy the evils of a war which had just terminated, leaving the country in great exhaustion. At the end of nine months he was obliged to leave his place. During this period all the fashions in Paris took the character of parsimony. Coats without folds were worn; snuff-boxes were made of plain wood; and, instead of painted portraits, outlines only were drawn in profile. All these fashions were called *à la Silhouette;* but the name remained only in case of the profiles.

SILICATES, a great group of minerals, compounds of various elements with silica. The group includes a few important ores, but is chiefly significant as the great group of rock-forming minerals. A discussion of the important minerals of this group will be found in the introduction to the article on rocks. See also FELDSPAR; AMPHIBOLE, etc.

SILICIFIED WOOD, a variety of the minerals quartz or opal in which the mineral has replaced the wood. Opalized wood is wood changed into opal; petrified wood includes either of the above as well as wood changed into coal (see PALÆOBOTANY). According to J. D. Dana the trees now silicified in Arizona seem originally to have flourished on the shores of an inland lake, into which they fell and became water-logged; then they were buried beneath volcanic material of a highly silicious character which underwent alteration through the action of water setting free more silica than the water could hold in solution. As the wood decayed this silica was deposited in its cells until finally the woody fibre completely disappeared and what was once wood became quartz. As this change took place only particle by particle, the minutest cells of the wood are preserved and may be seen under the microscope. In the great petrified forests of Arizona, now a government park, there are trunks of trees three or four feet in diameter and over 100 feet in length, completely changed to quartz. Over the whole section are scattered petrified trunks and fragments from the size of a hickory-nut to several feet in diameter. At one place in the park a petrified tree has fallen across a ravine about 50 feet wide, forming a natural bridge. This Arizona petrified wood has been extensively exhibited and sold under the trade names of "jasperized wood," "agatized wood" and "woodstone," having been manufactured into tiles, paper-weights, cane and umbrella handles and many novelties, while complete transverse sections have been mounted as table-tops. The material is partly jasper, richly colored red and yellow by the oxides of iron and partly translucent chalcedony, with occasional spots of clear quartz and amethyst. Silicified wood abounds in the Rocky Mountains, while a similar forest exists in the Yellowstone Park. Opalized wood is also common, especially in California and Oregon. Consult Merrill, 'Fossil Forests of Arizona' (1911). See FOSSILS.

SILICIOUS SINTER. See GEYSERITE.

SILICON, *in chemistry,* one of the non-metallic elements, symbol Si, atomic weight 28.4. Next to oxygen it is the most abundant element found in the earth. It does not occur in nature in the free state but in combination with oxygen (silica) and with oxygen and various metallic elements as potassium, sodium, aluminium, calcium, etc., in the form of silicates. Silicon may be prepared by heating a mixture of metallic sodium and the double fluoride of sodium and silicon ($Na_2SiF_6+Na_4=6NaF+Si$); also by action of heat on a mixture of magnesium and silica (sand). It exists in three allotropic forms, an amorphous brown powder, a graphitoidal and a crystalline variety. The amorphous form is insoluble in all acids except hydrofluoric; it dissolves in potassium hydroxide to form a silicate, and burns in the air at high temperatures to SiO_2. The crystalline variety is very hard, is but little if at all attacked by hydrofluoric acid or potassium hydroxide and cannot be burned. Silicon forms compounds with oxygen, sulphur, chlorine and some others but the most important are the oxide SiO_2 and the salts derived from the various silicic acids.

Silica, SiO_2, oxide of silicon, occurs very abundantly in nature both in crystalline and amorphous forms. Quartz, a very pure form of silica, crystallizes in six-sided prisms terminated by six-sided pyramids. The finer crystals of quartz are called rock crystal, while the imperfectly crystalline varieties occur in a number of forms. Of the cryptocrystalline and amorphous forms we have opal, agate, amethyst, flint, sand, etc. Silica can be obtained in a fine

state by melting sand or a silicate with sodium carbonate whereby a silicate of sodium is formed. This is dissolved in water and hydrochloric acid added. Silicic acid separates in a gelatinous condition. The whole is evaporated to dryness, heated for a time a little above the boiling point of water and then washed with dilute hydrochloric acid. The silica is left behind as a gritty white powder insoluble in water and in most acids. Hydrofluoric acid dissolves it, however, with the formation of silicon tetrafluoride (SiF_4). It also dissolves in alkalies to form silicates. Silica is not acted on by heat except that of the oxyhydrogen blowpipe which fuses it. Silica, generally in the form of sand, is used largely in the preparation of mortar, glass and pottery. In metallurgical operations it is used as a flux with ores containing limestone with which it forms a glassy slag which floats on the molten metal carrying with it many impurities from the ore. Silica forms a number of hydrates which have acid properties and from which a vast number of salts are derived. A great many very complex salts of these silicic acids are found in the earth's crust, the metallic elements being usually sodium, potassium, magnesium, aluminium, calcium and frequently small amounts of other elements. Some of the best known silicates are the minerals feldspar, mica, garnet, talc, meerschaum, etc. Clay is largely a silicate. See QUARTZ; ELECTROCHEMICAL INDUSTRIES.

SILICON CARBIDE. See ELECTROCHEMICAL INDUSTRIES.

SILIUS, Titus Catius Italicus, Roman poet: flourished about 25–101 A.D. At Rome he applied himself to the bar, and became a celebrated orator and advocate. He was consul at the time of Nero's death and incurred some reproach for assisting in that tyrant's prosecutions, but acquired honor from his conduct in the proconsulate of Asia, assigned to him by Vespasian, from which he retired into private life, and collected books, statues and busts of eminent men. He finally retired to his seat in Campania, where he died. The only work of Silius which has reached modern times is an epic 'Punica' in 16 books, written with more diligence than genius. It takes as its theme the Second Punic War, according to Livy and Polybius, and contains occasional splendid passages; the description of the passage of Hannibal across the Alps is particularly admired. There are editions by Drakenborch (1717), Ruperti (Göttingen 1795–98, two vols.), and Bauer (Leipzig 1891–92). Consult Butler, H. E., 'Post-Augustan Poetry' (Oxford 1909) and Schanz, Martin, 'Geschichte der römischen Litteratur' (Vol. II, pt. 2, 3d ed., Munich 1913).

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and by melting sand or silicates with sodium carbonate, crystals of silicate of sodium is formed. This is dissolved in water and hydrochloric acid added. Silicic acid separates in a gelatinous condition. The whole is evaporated to dryness, heated for a time a little above the boiling point of water and then washed with dilute hydrochloric acid. The silica is left behind as a gritty white powder insoluble in water and in most acids. Hydrofluoric acid dissolves it, however, with the formation of silicon tetrafluoride (SiF_4). It also dissolves in alkalies, to form silicates. Silica is met with in two forms, crystalline and amorphous. The crystalline variety is the more abundant and occurs in hexagonal prisms which have a specific gravity of 2.65 and a hardness of 7. Rock crystal, amethyst, cairngorm stone, carnelian, chalcedony, flint, jasper, opal and sand are all forms of silica. Silica, generally in the form of sand, is used largely in the preparation of quartzy glass and pottery. In metallurgical operations it is used as a flux with ores containing limestone with which it forms a glassy slag which floats on the molten metal, carrying with it many impurities from the ore. Silica forms a number of silicates which have acid properties and form what is a vast number of salts and derivatives. A great many very complex sets of these silicic acids are found in the earth's crust, the metallic elements being mainly sodium, potassium, magnesium, aluminium, calcium, and frequently small amounts of other elements. Some of the best known minerals are the silicates (Orthoclase, felspar, mica, hornblende, etc.). Clay is largely a silicate. See QUARTZ; ELECTROMETRIC INDUSTRIES.

SILICON CARBIDE. See ABRASIVES; and ELECTRIC FURNACE.

SILIUS, Titus Catius Italicus, Roman poet, flourished about A.D. 101 (or 25). He rose to notice himself at the bar, and became a celebrated orator and advocate. He was consul in the time of Nero's death and himself took repeated for assisting in the tyrant's proscriptions, but acquitted himself from his conduct in the proconsulate of Asia assigned to him by Vespasian, from which he retired into private life, and cultivated letters, friendship and hospitality. He finally retired to his seat in Campania, where he died. The only work of Silius which has reached posterity is the epic "Punica" in 17 books written with more diligence than genius. It takes as its theme the Second Punic War, according to Livy and Polybius, and contains several splendid passages; the description of the passage of Hannibal across the Alps is particularly admired. There are editions by Drakenborch (1717), Ruperti (Göttingen 1795–98, two vols.) and Lemaire (Lutetiae 1823). Consult Duff, H. L., "Silius Italicus" (Oxford, 1930); and Schanz, Martin, "Geschichte der römischen Literatur" (Vol. II., pt. 2, 3rd ed., Munich 1913).